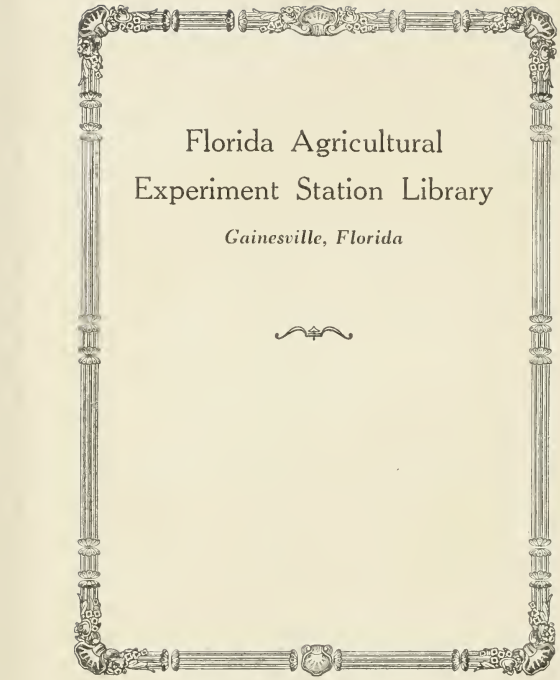
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AGRICULTURAL ECONOMICS

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AGRICULTURAL ECONOMICS

A SELECTION OF MATERIALS IN WHICH ECONOMIC PRINCIPLES ARE APPLIED TO THE PRACTICE OF AGRICULTURE

BY
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PREFACE

This volume represents an effort to carry over into agricultural economics some results of recent experience in the use of the discussion method of teaching elementary and intermediate courses in economics. The book aims to bring together in an orderly arrangement, (1) a store of information which may profitably come within the view of the student who desires to understand the economic phenomena of agriculture, and (2) a considerable number of opinions which have already been expressed as to the meaning of these facts. The introductory discussions contributed by the editor are not designed to reconcile the theories propounded by the many authors quoted, nor to give an authoritative "interpretation" of the whole. In some of them are suggested the reasons which led to the inclusion of particular selections, some of them point out salient aspects of the problem dealt with in the chapter, some suggest the need of more careful scrutiny than seems as yet to have been given to one or another phase of our subject. Very evidently, then, the book is offered as food for thought and a stimulant to the thought-process, not as a scripture to be learned by rote.

While, on the one hand, it does not aspire to give a final answer to all the economic problems of agriculture nor to teach a hard-and-fast system of rural economy, neither does it, on the other hand, content itself with merely presenting a certain number of concrete "cases," putting upon the student the necessity of distilling the principles from the facts. For, even granting the possibility that he might achieve some measure of success in such an effort, it would be poor economy of labor. We should be accounted improvident if, in building our agricultural economics, we should fail to utilize, as fully as possible, the foundations laid in the past. The beginner will do well to avail himself of such principles as have already been formulated, making experimental applications of them to the actual conditions which he observes about him. Ultimately he may perceive deficiencies in these statements of economic law, but for a longer or shorter time they will furnish him a much-needed guide to critical and constructive thinking. The plan of this book, therefore, is to have each chapter (except a few which are frankly descriptive in

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character) begin with a section devoted to the points of theory involved in that division of the subject. These readings are followed by others which present data for verification, illustration, or disproof. The principles quoted are not in all cases such as meet with the compiler's full assent, but careful effort has been made to include only such statements as are worthy of serious consideration and are likely to be of service in arriving at an understanding of the various problems.

Clearly, the use of more and shorter readings, the greater stress upon organization of this selected material, and the chapter introductions cause a book of this sort to be less a source book in the older and stricter sense, and to combine many of the desirable features of a text, while escaping its most serious drawbacks. For myself, I should call this a "composite textbook," and add that the material is presented in this form, not because native laziness has made the editor shirk the task of literary composition, but because of a belief that in this form it has the greatest teaching value. The author of a text aims to reduce to a single compact line of statement all the mass of fact and interpretation that he has marshaled together, and to give to his work a finished form—in short, to make a compelling statement of the one true gospel. But the first task for any competent instructor, using that textbook so carefully organized for "clearness, force, and elegance," is to expand and supplement and alter according to his needs the material there presented. The text-writer constructs, as it were, a smooth, straight highway of thought, down which the student whizzes to his appointed destination without getting much benefit from the journey. He needs to tarry and visit, to wander back and forth, to explore the country and learn the whole region, if he is to be a well-informed traveler when he dismounts at his journey's end.

The readings here presented have been taken from many settings and retain evidences of their points of contact, thus showing the relations of the different portions of our subject to other phases of the life of which it is a part. Many spots of the ground are covered more than once in different connections and from different avenues of approach. This is not mere needless reiteration. Every experienced teacher knows that teaching consists largely in such repetitions, by which the student is led all around a subject in order to learn its different aspects and its many bearings. This is the purpose for which the teacher commonly uses "assigned readings." But the

assigned reading often contains, along with the matter wanted, an equal or greater store of things which the instructor does not care to have brought into the student's view at the moment. How often we find the student coming back with his mind full of just the wrong part of the discussion read! For that reason no long readings are presented here: all have been "adapted" to exclude extraneous material and focus attention upon the point at issue.

As for the general plan upon which the organization of the material has been made, it goes without saying that it follows the older rather than the newer type of economic thought. The decision to use the fourfold division into consumption, production, exchange, and distribution grew out of a desire to make the book most serviceable to present users, rather than out of any personal devotion to conservative ideals in the matter of economic exposition. Such teachers of agricultural economics as have broken with the orthodox traditions will readily reorganize these materials to suit their own purposes; others, I judge, will find the present arrangement convenient.

This volume is intended primarily as the basis for a general course in agricultural economics covering three one-hour periods throughout a college year. Personally, I expect to use it in lieu of a textbook (as I have already used much of the material), though other instructors may prefer to use it in connection with a regular text. Much would depend upon local circumstances. If a course in elementary economics is a prerequisite for students in agricultural economics, it would seem that further use of a text could readily be dispensed with. In the case of a class possessed of no previous training in economics, assigned readings may be added either from one of the few treatises on agricultural economics or from the many on general economics. However, it has been the intention to include readings covering enough of the fundamentals of economic theory so that a supplementary text might not be called for. A classbook of questions and exercises, now in course of preparation to accompany this volume, will, it is hoped, further develop and organize the materials for classroom use, and facilitate searching and profitable discussion of the economic problems treated in this volume.

As for other uses, it is hoped that the book may be found a useful supplement to the text or other materials in courses in marketing, rural credits, or the like. Likewise, the interests of the many high schools which are today devoting a large measure of attention to agricultural affairs have been borne in mind. For the giving of added

information about the farmer's economic life, even where no comprehensive grasp of principles is attempted, many of these selections should prove helpful.

The purpose of the book will be achieved if it be found to be a reservoir whose contents have been kept in a sufficiently fluid state so that many may come and draw to fill their different measures for their diverse needs—and if the average quality of the contents be found good.

It is apparent that I am under heavy obligations to the many writers and publishers whose generous contributions have gone so far toward the making of this book. Their names appear from page to page. To others I am indebted for many helpful suggestions concerning the selection or organization of the material: to Associate Professor James A. Field and Assistant Professor Harold G. Moulton, of the University of Chicago, Dr. Charles L. Stewart, of the University of Illinois, and to my colleague, Mr. J. S. Waterman.

E. G. N.

University of Arkansas
September 10, 1916

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INTRODUCTION: THE AIM AND SCOPE OF AGRICULTURAL ECONOMICS[1]

From time to time, of late, we have seen an increasing number of colleges and universities adding some course or courses in agricultural economics to their published announcements of subjects of instruction. Sometimes these courses are actually presented as scheduled. Often, to my certain knowledge, they are not. But the name, at least, is with us, and many are asking (and perhaps not least of these are the wistful writers of the college announcements), "What is agricultural economics?"

Possibly the only way to arrive at an answer strictly germane to the query "What *is* agricultural economics?" would be to tabulate these prospectuses from college catalogues, to ascertain and report the actual content of the instruction offered in classroom or lecture, and to review the textbooks or uncodified materials used in the conduct of the courses. We shall, in fact, have some recourse to these methods at a later stage of our discussion. But the quest for a definition may well include an attempt to set forth a fair ideal, instead of contenting itself with merely reporting the "spotted actuality." The really important question is what agricultural economics *may* be or *should* be, and in trying to find the most adequate answer that we can to that inquiry we must not be timorous of passing beyond a strict account of what now is.

I

Doubtless the suggestion which comes most readily to mind is to the effect that agricultural economics is simply general economics applied to the particular business of farming. To answer thus is but to shift the question. What, then, is "general economics"? Very slight acquaintance with economics and economists would suffice to show that it is not one thing, but many. As to scope, method, point of view, purpose, and specific content there is widespread controversy. Their single element of unity consists in the fact that all these labors lie within the wide field of wealth phenomena. There is no pure strain of economics, any more than there is a pure strain of Americans.

[1] Adapted from the *Journal of Political Economy*, XXIV (April, 1916), 363–81.

We have, instead, hyphenated economics, showing plainly their extraction from political, philosophical, or other outlands, just as we have only hyphenated Americans, owning more or less remotely the ties of some European mother-land. To apply the term "orthodox economists" to ourselves (or to our enemies) is but a harmless pleasantry, so long as American specific productivity, German socialism, and Austrian marginal utility contest the field with English classicism—and neo-mercantilist and neo-canonist doctrines crop out at every unguarded point. To retain the title political economy is frankly to admit a mixed descent, and join the hyphenated company of social-economics or the newer entrepreneur-economics.

If, then, the "general economics" which is to be "applied to the particular business of farming" prove in fact to be any one of a number of different doctrines, evolved from dissimilar philosophies of wealth, the question becomes pertinent whether they fit with equal ease into the rural setting, or whether certain of them have been elaborated from essentially non-agricultural data, and are applicable primarily to industrial and urban conditions; whether certain other of these economies adapt themselves peculiarly to a rural environment; and whether, perchance, a close inductive study of the business of farming might not serve to give a special direction to economic thought, a particularized body of economic doctrine—in short, an agricultural economics which shall be more than a mere application of industrial economics to agriculture.

It is quite evident that the first economic ideas that were excogitated by men of the early day—before economic theories were differentiated from the general mass of domestic, political, or religious opinions—were derived primarily from agricultural data, since agriculture was so preponderantly the form of all economic activity. It is equally true, however, that the problems of value of product and cost of production took on but the haziest outlines until the development of commercial relations made clear the fundamental facts of exchange-value, and thus gave new emphasis to the relation between income, costs, and profit. The economic problem of agriculture (as something different from its merely technological problem) did not take shape until husbandry found itself overtaken by, and made part of, a differentiated commercial-industrial régime.

The mere fact that economics began with an "agricultural system" or was, as it styled itself, an *économie rurale*, does not mean that it derived from rural data a set of answers to the questions which we

now regard as of prime economic importance. In England the classic writers gave but scant attention to these ideas of the physiocrats. Adam Smith refuted the "agricultural system" in about one-tenth the space which he devoted to demolishing the arguments of mercantilism. He is interested primarily in the division of labor, the employment of capital, and kindred topics, and, from his day on, the run of attention in Britain was toward trade and the new industrialism. Nor was it long before the growth of industrialism in America gave to our economic discussions a setting not dissimilar to that which commanded the attention of European thinkers, and the men of the new American school owe more to English and Teuton inspiration than to a direct descent from the earlier native writers. Neo-classicism naturalized (and shall we say improved?) amidst our new industrial surroundings the system that English writers from Smith to Mill had deduced from a similar but earlier period in the life of our British cousins. Specific productivity was the American elaboration of the germinal idea of marginal utility developed by Jevons and the Austrians. The more specialized this development became, the more did it depart from agricultural sources of inspiration, the more did it concern itself with the solving of problems of factory wages, interest upon funded capital, and the profits of industrial entrepreneurship, and the less pertinent did its discussions become to the problems of the organization of farming and of the farmer's income. Should we take Professor Clark as typical of this movement, it seems evident that his mind has not been filled with contemplation of rural life and the economic activities of country folk. Though Clark took his cue from a suggestion of Henry George concerning agricultural utilization of land and labor[1] and from von Thünen's[2] analysis of rural enterprise, his own elaboration of the specific productivity doctrine seems distinctly to be based upon conditions of incorporated capital, minute division of labor, and wire-edge competition in entrepreneurship and hence an *imputation* of productivity not dreamed of by the farm proprietor.

In view of the fact that several of the recent writers seem definitely to have turned their eyes away from agricultural data, it appears all

[1] Clark, *Distribution of Wealth*, p. vii.

[2] *Ibid.*, footnote, pp. 321–24. Those who do not find themselves in agreement with the specific productivity theory might feel that the very fact that von Thünen was analyzing an agricultural situation was what saved him from going to the lengths to which Clark went.

the more noteworthy that they have arrived at much the same conclusion as did the early Americans, who could see nothing else. Both tend to eliminate the distinction between land and capital.

This raises the whole question of the "surplus" concept, which is the keynote of so much of economic theory. From the physiocrats to Carver and Taylor, through classic and neo-classic lines of descent, there has been a school which views surplusness as an attribute of the land. The Socialists, on the other hand, were concerned with a surplus attributable to labor. And modern industrial economics inclines to identify the idea of a surplus with the function of entrepreneurship and to believe that such surplus goes inevitably to the controller of capital, whether the form of capital be land or other instruments of production.

We have already noticed that this first idea has persisted from the most ancient to the most recent discussions of the economics of agriculture. Entrepreneurship as such is not an idea which has been very largely developed in connection with rural enterprise, but it is probable that the modern farmer who views his payments for rent or land purchase in the same light that he does his outlays for other productive goods comes to identify, at least vaguely, his chance of securing profits with his ability to control capital. If one now has to pay two hundred dollars an acre in order to get a farm and benefit from the extraordinary profits that accrue by reason of the outbreak of the European war or the rise in the cost of living, it is evident that the entrepreneur gains in agriculture are indeed a function of the control of capital. But when one could take up a homestead gratis from the government, the essential prerequisite to entrepreneurship was evidently not the control of capital, but the ability to endure hard work and privation and to bear many children. Since, however, these are personal qualities, their possessor commonly regarded all his income as the return to labor. In fact, it has been characteristic of our farmer folk that they have never formed the habit of thought which imputes some part of the total product to factors of production other than labor. Where they have created a value upon raw land and secured capital by a process of saving rather than by borrowing, the productive power so added has appeared hardly less personal than physical strength, native shrewdness, or an acquired education. When, after a generation or more of such conditions, mere ownership of land and capital passes over to non-resident hands, while the actual productive operations remain in the hands of the farmer, have we not

the conditions for the development of a socialist philosophy in the open country, such as has never been furnished by slave and villein and yeoman types of farming?

Assuredly the inner facts of Granger legislation, the rural attitude toward Eastern mortgage-holders in the nineties, and the present gospel of hate toward the produce middleman would all be worthy of a careful search for the purpose of ascertaining whether here are or are not the inductive materials out of which our country populations are building up a socialistic philosophy of their own. Certainly the call for state aid wails loud in the land whenever the farmer believes himself to be losing ground in his contest with other classes. Only the form of the demand changes with the times; from internal improvements to cheap money, from extensive bureaus of agriculture to rural credits. Lassalle's theory of *Konjunctur* finds a very pretty illustration when the farmer admits that the risks of modern commercial agriculture are too much for him to meet single-handed. To only a very small extent has he underwritten them through private agencies of equalization, such as hail-insurance companies. He seems more keen by far to socialize them through state activities paid for by taxes upon public-utility corporations or by customs duties. Some of the proposals soberly propounded by cotton-planters after the outbreak of the present war were calculated to take even a socialist's breath.

The writer has no desire to press this discussion for its own sake. What has already been said is merely for the purpose of suggesting that there are fundamental questions of theory underlying the practical programs whose discussion makes up so large a share of what we know generally as agricultural economics, but which all too often fail to touch bottom on any economic principle whatsoever. Agricultural economics is, no doubt, an application of general economics to the particular business of agriculture, rather than an independent set of doctrines built up out of a specialized body of data. But this is not to be an application entirely after the fact: economic laws are not promulgated like edicts from some imperial capital imperfectly informed concerning conditions within the province in which they are to be applied. All voices must be heard in the establishing of truths, not less than in the securing of political stability. If we are to avoid the dangers of an industrial economics of capital or a socialist economics of labor as well as an agricultural economics of land, the facts

of farm enterprise must not be neglected in favor of the data of commercial and manufacturing activities by those who aspire to enunciate the principles of the science.

To resort to an analogy, agricultural chemistry is not a science distinct from industrial chemistry and both of these in turn independent of some unspecialized general chemistry. It is, instead, the application of principles, supposed to be universally valid, to the particular phenomena of agriculture. But the man who goes forth equipped with this general chemistry into the field of agricultural research begins at once to add to his store of knowledge of chemical properties and reactions. He must qualify, correct, and extend those principles with which he first essayed to solve the chemical problems of soil fertility, of plant and animal life. And these labors of his, detecting error and discerning new truth, go in due time to enrich the central science of which his field is but a specialized department.

Similarly, agricultural economics is not a science distinct from other economic science, nor, on the other hand, is it merely an art devoid of scientific implications and responsibilities. It may happen, indeed, that the very attempt to apply to agriculture, economic theories of supposedly general validity but elaborated from industrial surroundings, shall prove to be the test which reveals the inadequacy of their premises or the incompleteness of their analysis. At all events, the most careful builder of an economic system cannot felicitate himself upon having achieved a really valid doctrine until he has ascertained the adequacy of his principles to explain the facts of rural as well as urban enterprise.

Nor does it behoove us to be narrowly insistent that what appears to be the truth in our particular sphere is the truth about the whole. We should get a larger sense of relationships than did the blind men of the fable. The elephant is not a great serpent, even though a close inspection of his trunk might suggest such a thought; nor is he like a tree, though feeling of his legs shows them to be treelike; nor yet is he fashioned like a wall, though passing a hand over his broad, flat sides may lead one to suppose so. In fact, the whole truth even about trunk or leg or side can be perceived only when it is considered as part of a larger whole. The best hope we can venture for agricultural economics is that it shall take and maintain its proper place of dependence and assistance, and that general economics may be both its point of departure and the goal of its return.

II

But this is only half the story, and many who profess an interest in the subject would doubtless pronounce it much the lesser half. The demand of the hour is not for a science adjusted with nicer refinement to all phases of the truth, but for an art to give immediate and practical counsel concerning the conduct of today's farm undertakings. When technical improvements have gone as far as they may, it is still evident that modern agriculture is more than a merely technological process, since the success of agriculture is to be measured in income and not alone in physical units of product. Toward this end of enlarging cash return in an exchange society the art of economic organization is not less important than scientific knowledge of fertility and plant and animal breeding.

When we come to set forth this art of agricultural economics in a formal statement, however, it becomes evident that its character will be much modified by the nature of the goal we have in mind. Is it that of individual gain, national strength, or social well-being? We in America have got, perhaps, far enough away from the older and narrower ideas of nationalism so that we feel little or no conflict between these latter two ideals. And under conditions of peace the economist would be likely to agree that a policy that secures social welfare makes, by so much, for national strength. However, the first group of writers who turned serious attention to the subject were not thinking solely of conditions of peace. In Germany the economic art of agriculture has not been concerned primarily with securing a large return to the farmer or of directing the productive forces of the nation into the channels where national resources and market conditions offered greatest return upon suh cexpenditure, but a canny eye has been kept upon the exigencies of possible war and the need of having the country able to feed itself in such a crisis. By way of illustration, we may quote a few lines from a treatise on agricultural economics published in 1899:

> Under normal circumstances the domestic agricultural production of a nation should certainly provide for the needs of the resident population as to necessary products of the soil, especially as to the indispensable foodstuffs. Otherwise the country falls into a position of greater or less dependence upon other states, which are in a position to produce more human subsistence than is needed within their own domains. This dependence is especially precarious in time of war and for such lands as, like the German Empire, are bounded on nearly all sides by other countries, and have only a very limited

access to the open sea. In a war with Russia, France, England, or several of these countries together, the adequate maintenance of the home population might be seriously endangered. To be sure, this danger is somewhat lessened by a strong fleet, such as we hope to have in our possession in the course of a few years, but yet is by no means entirely removed. *It remains, at any rate, an especially vital problem for German agriculture to strive to provide its domestic needs of indispensable means of subsistence, and particularly its breadstuffs.* Out of regard for its own existence, even, the government is compelled, so far as lies within its power, to assist agriculture in the solution of this problem.[1]

Thus is German agricultural economics indentured to the service of a politico-military master, rather than left to an intellectual freedom of enterprise. It is designated *Agrarpolitik*—a not-to-be-neglected segment of the cameral *Nationalökonomie.*

Quite different is the *économie rurale* of France, and decidedly worthy of our attention because it appears to be most closely akin to much of the work which has been done in our own country. While the character of the German *Agrarpolitik* was being determined by the dedication of all scholarly endeavor as well as material resources to the purpose of national strength and self-sufficiency which has been unfolding since 1870, France has thought more in terms of individual prosperity of her farming population as furnishing the raw material of national well-being. Agricultural economics has been viewed as the culmination of a mighty effort on the part of agricultural science to put in the hands of the *cultivateurs* of France the most complete intellectual equipment possible for the pursuit of their calling. We may well let Jouzier, who has written probably the best of the French texts, speak for himself and his colleagues. He points out that, after the agriculturist has had a thorough training in pure science and the *sciences technologiques* of his craft—

> He is then able to practice the art of agriculture, which involves simple transformations of material by the process of cultivation, but not the industry of agriculture, which involves, at the same time and to a greater extent, the realization of an increase of wealth. And he needs, moreover, in order to enable him to accomplish this double purpose, to appeal to social science, which teaches him to understand man so far as he is a social being, the needs and desires which govern him, the higher laws which he obeys in the social relationships which he forms with his fellow-men; he ought lastly to have recourse to rural economics in order to learn, as we have said before, to co-ordinate the action of all his industrial resources, to the end of making

[1] Goltz, *Vorlesungen über Agrarwesen und Agrarpolitik*, p. 11.

the greatest profit possible. But if, according to our point of view, rural economics remains the science of the internal organization of the agricultural enterprise, we shall not commit the mistake of confining it within too narrow limitations and excluding from its province all that concerns the relationships of the enterprise with the outside world. It is, so to speak, the agricultural science of sciences, not because it claims a quality of superiority, but because it draws upon them all and sums them all up to speak the last word of technological science, *profit*.[1]

Here in the United States, anything approaching systematic study of the economics of agriculture was deferred until a very recent day. The extraordinary circumstances of the free-land period tended both to direct men's minds away from purely economic theorizing, and to mislead them when they did attempt to pass strictly economic judgments upon what was taking place in our agriculture. The outstanding facts about our farm situation were those of national enlargement, the growth of a home market for manufactured products, eternal speculation in land, and the providing of an attractive alternative of free enterprise on the farm for all who had accepted wage or salaried positions in trade or industry. Psychic satisfaction, speculative gain, the need of protecting an investment in land, or the inability to get away from a sorry venture in farming—these, with immigrant wage and living standards and blindness to the facts of impairment of fertility, conspired together so to obscure the issues as to actual costs of production and return to labor and capital that the whole situation touching the supply of agricultural products was thrown into confusion. Men acted as though they conceived themselves to be living under an economic moratorium, and the probability of an ultimate day of settlement was calmly disregarded. But the naïve assertion that "rainfall follows the plow" met tragic refutation in the years that followed 1883, and the widespread collapse of farm prices in the eighties and early nineties brought a strong revulsion from the craze of agricultural adventure.

[1] E. Jouzier, *Économie rurale*, pp. 14–16. By way of formal definition, he says (after giving the Greek etymological meaning of the word "economics"): "The addition of the modifier *rural* simply marks out the boundaries of the field for which it is to be understood. Instead of saying *the household*, we should say the *rural household*. And as the *rural household* is the *farm*, or, more precisely, *the agricultural enterprise*, we shall say that *rural economics is the branch of agricultural science which 'teaches how to organize the various elements which constitute the resources of the cultivator whether in relation to each other or with respect to persons,' in order to assure the greatest prosperity to the enterprise.*"

Of the physicians who undertook to minister to the farmer's ailments, two schools may be distinguished. The homeopaths, who believed that like cures like, attacked the ill of over-production by seeking to remove every obstacle that stood in the way of maximum yields of grains, of animal products, or of textiles. Such were the efforts of the numerous departments of agriculture, agricultural colleges, and experiment stations, which were being established one after another in the latter half of the nineteenth century. The allopaths, on the other hand, put their faith in stronger draughts of remedial legislation, such as cheap money (whether silver or greenback), the curbing of the railroads, tariff legislation, the lightening of taxation, and the curtailment of banks' and mortgage-holders' powers.

It might be hazarded that the greatest immediate benefit to the patient came from the old-fashioned process of "bleeding," whereby a considerable volume of country population was drained away to the cities during the years of agricultural depression. But, however that may be, agricultural economics has emerged as an eclectic movement superseding the two earlier schools. Since agriculture aims, not at bigger corn and fatter hogs as such, but at larger financial net returns, and since even political measures of reform must depend for their effectiveness and permanence upon their economic soundness, the hope of both the farmer and his friends has come to be placed more and more upon a broader and deeper understanding of the price relationships involved in the carrying on of our commercialized business of farming.

As already indicated, our professional economists have taken comparatively little part in the formulation of an agricultural economics. Whether because they were not sufficiently familiar with the data of scientific agriculture, or because they were too much engrossed in the study of the many pressing problems of our bewilderingly expanding industrial life, they have as yet sent but few adequately trained workers into the rural field. The task was accordingly undertaken by those already engaged in the work of instructing and helping the farmer. The need for economic readjustment came most pressingly to the attention of the men who had been commissioned first to work out a better technique of farming. Foremost among them were the administrative officers of our agricultural colleges and bureaus of agriculture, both state and national. These men did their splendid best to meet the new demand. But it can hardly be denied that much of the discussion which resulted has been of a decidedly inadequate

sort. This is but the inevitable consequence of the fact that the workers were trained as horticulturists, soil chemists, or veterinarians, rather than as economists. Their lack of specialized training caused the treatment of the subject to be fragmentary and superficial—prescribing salve for outbreaking sores, rather than tracing back the chain of their causation to some constitutional or organic derangement. Strangely enough, in the very quarters where the scientific method had been enthroned by chemist, entomologist, thremmatologist, agrostologist, and all the numerous brotherhood of scientific agriculture, it was empirical methods that were resorted to in the attack upon the economic problems of agriculture. Rural credits have been discussed as though the cost of capital accumulation or the productivity of capital outlays had no bearing on the question; farm prices in terms of "the parasitic middleman"; and the whole question of utilization and conservation of natural resources under the blanket of the "inherent rights of the farmer."[1] Co-operation is urged as a panacea for all rural ills, not as merely one particular form of economic organization, whose effectiveness in operation is determined and limited by the appropriateness of that special type to the given situation.

Schools that give evidence of the highest ideals so far as their technical courses in agriculture are concerned, who would regard it as fairly impious to offer courses in agronomy, animal husbandry, or horticulture without demanding a thorough grounding in chemistry, biology, and physics, appear to think that nothing but common-sense is prerequisite to a mastery of the most complex of the economic problems with which our agricultural industry finds itself confronted. Many such institutions, even some agricultural colleges in important farming states, offer no comprehensive survey of the field of agricultural economics but, instead, one or two separate subjects (co-operation, marketing, and rural credits are the favorites), which must in the nature of the case be mere descriptive treatments, since the students have had no previous training in general economic principles. Often the instructor himself has little more.

We are all aware, however, that the last few years have witnessed a considerable change, and that the subject has been greatly advanced. Young men who were intimately interested in, and familiar with, agricultural conditions (and who thus avoid the disability under which the older economists labored) have been carefully training themselves

[1] See *Report of the Country Life Commission*, pp. 29–41.

in economics (thus escaping the limitations of the older agriculturists) with the definite purpose of making a professional career in the field of agricultural economics. The question then obtrudes itself: What conception does this emerging group of specialists entertain concerning the subject which they are in process of elaborating? Here we find, as previously suggested, a striking kinship with the French *économie rurale*. The goal set up is productive efficiency, and agricultural economics aspires merely to extend the farmer's technique to cover and control value returns as well as mere physical units of product. Most of our agricultural economics has been developed in connection with our colleges of agriculture and, without disparaging its very great value and service, it may be suggested that current conceptions of the subject still remain somewhat under the shadow of this agricultural-college origin. That is, the system of independent and individually organized farm operation, which has grown up in the United States during the cheap and free land era, is taken as the datum plane above which is to be erected a structure of prosperity and economic efficiency. It may be an entirely valid conclusion of sociology or political science that we need to maintain an independent land-owning class of farm proprietors. But it is obvious that the economic theory of agriculture built upon such a premise is likely to be quite different from one constructed by economists untrammeled by preconceptions other than those laws (such as diminishing returns or the broader principle of combining proportions) which are the foundations of their own science.

There has been another group of thinkers, to be sure, growing up outside the professionally agricultural interests in recent years, as the failures or distresses of farm life and industry have crowded themselves upon general public attention. Migration to the city, decline of our agricultural surplus, and the rising cost of living have caused merchants, bankers, educators, politicians, and even the private consumer, to feel a sudden access of interest in questions touching the economic organization of our agriculture. They have not been concerned primarily about the prosperity of the individual farmer nor pledged to maintain the existing order, but they have been decidedly solicitous about the efficient working of the system as a whole, to the end that there may be cheap and abundant materials for trade and manufactures and a lower cost of living.

Now many of these persons have taken the position that the efficiency and success of agriculture as a whole are to be obtained only

by giving to the farmer-as-we-find-him a better training for his task and by making this training include business as well as scientific aspects of farming. Professor Carver writes a book to "emphasize the public and social aspects of the problem,"[1] and Mr. Roosevelt launches a Country Life Commission for "better farming, better business, and better living." But these efforts to make more stable the economic foundations of the existing politico-social system, as they work downward from the security of the yeoman class to the prosperity of the individual farmer, meet the rural leaders who are striving upward from personal success to group solidarity, and both join hands in a practical program of rural betterment.

It is evident, however, that this second movement is by no means the American counterpart of the *Agrarpolitik* of Germany. To be sure, it regards the country as the natural breeding ground of the nation, and the country family as the bulwark of our social and political system. But it does not propose that the whole course of agricultural production should be stimulated or retarded or, in general, artificially directed by means of tariffs, bounties, special transportation rates and labor arrangements toward the goal of national self-sufficiency in time of war. It is concerned rather with the maintenance of "economic independence," the most productive use of natural resources, and a proper balance between extractive, commercial, and manufacturing industry. But a close scrutiny of this recently awakened concern in farming as a business will serve to reveal possibilities of a new economics of agriculture which shall be more independent, more searching, and more thoroughly economic in character than any we have known in the past.

In the wild turmoil of exploitation, agricultural issues were confused; in the subsequent swing of interest toward trade and manufactures they were to a large extent neglected. But the present lively interest in agriculture promises a better balancing of our various industries and the thorough, patient disentangling of the economic issue concerned with agriculture. What we have learned in the more highly (and perchance less personally) organized departments of industrial life will give us at least hypotheses and suggest ways of going about the analysis of the problem of agriculture. Entrepreneurship, for instance, has come to be viewed as a distinct factor in economic enterprise, with a definite and recognized position of reward and service. What shall we say of entrepreneurship in agriculture?

[1] *Principles of Rural Economics*, p. v.

Evidently there is opportunity and need for the economist to analyze and expound this phase of agricultural organization. One suspects that he might reveal significant wastes of managerial ability in a system where the great majority are limited to small, privately organized farms, and a crippling lack of such ability where nearly every farm worker must organize and conduct his own industrial unit. Much the same may be said for capital and labor. When the alert business man finds that there are opportunities to make capital earn larger returns in agriculture under his own direction than by loaning it to farmers, or greater chances of reward to entrepreneurship in farming than in commercial operations, then we may be sure that the existing organization is going to meet competition of a new order. Whether the economist shrewdly traces out these influences and tendencies a day before they become working realities, or whether he be simply an up-to-date and intelligent interpreter of what is going on about him, his services in this direction are much needed if we are to act intelligently toward the future of our husbandry.

Agricultural economics should teach us to think through the utopia of co-operation or the bogey of corporation farming to the fundamental issues of effective economic organization of human effort and natural resources, which underlie them. Beneath the superficial problems, such as how best to distribute a carload of peaches, to procure a blooded breeding animal, or to effect the underdrainage of a particular field, are to be discerned certain larger, more general principles whose operation determines what is the most efficient way of equipping labor with capital-goods and captaining it with entrepreneurship for the production of agricultural commodities. That is the ultimate problem of agricultural economics, and, whether social welfare or private gain be taken as the point of departure, the real battle must be fought upon this ground.

To set forth explicitly the goal and purpose of our work is in large measure to clear up our ideas as to the proper scope and manner of treatment of the subject itself. The essential reason we have for teaching economics at all is that the student may learn to "think economics," to trace the cause-and-result sequence as touching the phenomena of wealth, whether the specific problem in which these phenomena have their setting be one which involves his immediate interest in private income and property or the larger interest which as a citizen or member of some other social group he is bound to have

some part in shaping. By the same token, our purpose in elaborating an economics of agriculture is to train the agriculturist in the business principles which govern the commercial success or failure of his enterprise, but not less to enable him, and likewise those others who are not engaged in agriculture, to perceive the economic results which will flow from one sort of agricultural organization or another, from one sort or another of consumption of our resources of land, labor, and capital.

For the college of agriculture there should be, by way of foundation, a general elementary course covering the fundamental principles of economic theory. The elementary course in economics as presented in most American colleges and universities today has been pretty well standardized: this same general subject-matter is well suited, by merely substituting the facts of agriculture, to point the morals and adorn the tale, to furnish the content of the basal year in agricultural economics, leaving to subsequent courses the more detailed treatment of special phases of the subject. An examination of textbooks and college announcements seems to indicate that at present most courses begin with a rather detailed study of production (now often including marketing) and, except for the many who stop with that, leap over to a fragmentary discussion of distribution as touching the farmer's profits. But this is no adequate preparation for meeting the more intricate problems facing modern agriculture. The student, besides examining the economic factors in technical productive efficiency, needs to understand the laws of value and the process by which physical units of product are fitted to psychic units of want through the agency of an exchange mechanism; he needs to consider, not only how this aggregate lump of values is broken up into private incomes, but how the use of this wealth in private hands reacts upon the further operation of the system. Even when for practical reasons the course in agricultural economics must be much compacted, it should be reduced to a stout framework of fundamental principles instead of bloating into a flabby mass of descriptive generalities. The sea of print inundates the country as well as the city today, and the young man who goes out from the agricultural college will have presented to him more than enough plans and projects and suggestions concerning the conduct of his business. Our best service is in training him so that he will think clearly and choose wisely, to enable him to distinguish between alluring promise and innate possibility of performance.

But such labors with and for the student who expects to take his place in the agricultural class is not all. The status of our agriculture is not exclusively the concern of country people, but is an issue of the highest public moment. As such it should command a broad and deep attention. We have long since perceived the value of presenting courses dealing with labor unions, trusts, and railways to young men who do not anticipate ever joining a union or employing others who have, who will certainly never be directors in even a small corporation, and who may never even so much as own a share of industrial stock or a railroad bond. It is clearly a matter of much importance that the college-trained men of the oncoming generation shall be prepared to act intelligently, whether as business men or as citizens, with reference to these great economic institutions. But surely the importance of agriculture in our whole industrial system is great enough to justify in no less measure the inclusion of at least one solid course in agricultural economics in the curriculum of every great university, even though it have no professional school of agriculture.

I

THE EMERGENCE OF THE PROBLEM OF AGRICULTURAL ECONOMICS

Introduction

The time ordinarily devoted to a general course in agricultural economics does not permit of indulging in any extended survey of the history of agriculture. Yet it seems quite indispensable to a full understanding and a fair appraisal of present situations, that one should have some little acquaintance with the conditions and circumstances out of which they have grown up. For immediate problems, even though brief and local in their manifestations, are not isolated phenomena, but are new phases or more complex forms of problems that have often vexed the husbandman before.

All that can be attempted within the scope of this volume is a lightning journey through the ages, glimpsing the most striking and typical of the steps which mark man's progress from the savage state to our present organization of agriculture. This should give at least a sketchy background against which to view current events and institutions—a thing quite necessary to the keeping of a true perspective. We have had, in the United States, a remarkable uniformity of agricultural experience and organization, with very few antique survivals. As a result, one often finds it necessary to emphasize the obvious fact that agriculture was not, indeed, ordained by the Morrill act and the Ordinance of 1787. Our look forward upon the future organization of agriculture should not be constricted by so brief a tradition as that of the American "homestead" farm of one hundred and sixty acres. Rather it should be oriented by the long glance backward over the whole of the road which society has thus far traveled.

Such a review can hardly fail to impress one with the painful slowness with which agricultural evolution has been accomplished. Ages were consumed by our savage ancestors in puzzling out even the crudest devices for feeding themselves more amply than was possible through mere passive reliance on Nature's bounty. Even when pressure of numbers brought added stimulus to effort, the ancient peoples

met with but meager success in their attempts to circumvent the "niggardliness of Nature." The narrow limitations of their knowledge prevented them from securing any considerable control over natural forces. Energies were directed toward finding new Gardens of Eden, where the gods gave lavishly (or of fighting for possession of the old ones), rather than toward perfecting an art of food production. Not till the coming of modern natural science did agriculture become either so productive or so dependable that it could be extensively commercialized. And it is this commercialization of agriculture that marks the emergence of the modern economic phase of this ancient art.

This new feature is popularly described as the "business of farming." The economist would perhaps supplement that phrase by adding that it is an attempt to organize technical efficiency in agriculture upon a plane of "pecuniary valuation." By this he means that it is not enough for the farmer to consider merely the bulk of goods which he is to produce, content in the thought that more goods mean more to eat and to wear. Instead, he must bear constantly in mind the *price* for which he can sell the goods which he produces and likewise the *prices* at which he can secure the machinery, seeds, and fertilizers used in such production; he must have regard to the money wage he must pay to secure labor and the price he must pay, as interest, to secure the use of capital. Like every other industry, agriculture today is controlled and directed by the influence of prices, arrived at through the process of bargaining.

Such has not always been the case. For many centuries in the early life of the race the production of food, clothing, and other agricultural goods was communal. The producing unit, whether family, clan, or tribe, was self-sufficing; it produced goods for its own use, and had few if any exchange relations with other groups. Within itself, too, price relations were unthought of. Labor was not organized on a basis of money wages, and loan capital was unknown. In the fighting clan, the labor element in production was merely a by-product of military enterprise, and the issue was not whether the proprietor could afford more help, but whether a campaign could be successfully carried off.

The pastoral stage of development was characterized by a patriarchal type of organization, and both labor and the rewards of labor were assigned in accordance with rules of status. It was a purely domestic arrangement (perhaps under religious sanctions) which determined how much labor should be rendered and how much of the

common profit enjoyed by the son or daughter and by the kin of varying degrees of relationship to the head of the patriarchal household. As for the feudal régime of the Middle Ages, Professor Ashley has admirably pointed out how fully the activities of the manor were dictated by custom and how completely competition was excluded. Under all these older types of social organization, the economic problem of agriculture was absent or, speaking more accurately, lost to view beneath some other aspect—political, domestic, military, or whatever.

It is evident that even in the earlier stages of this process economic considerations began, here and there, to emerge. Slaves, which at first were merely plunder from the conquered enemy, came to have a market value, based upon capitalization of their labor power. Likewise, labor dues under the feudal system were arranged somewhat upon an exchange basis, labor being the price of military protection or judicial security. Barter grew up, and in time the articles exchanged came to have their values computed in terms of some standard unit, such as a sheep or a measure of grain or oil—primitive types of money.

In all these cases the conduct of agriculture was becoming an economic and not merely a technical problem. The development of Mediterranean commerce and of Roman ideas of property rights went far toward defining the problems of agricultural economics in classic times, but the social organization of the Middle Ages again obscured consideration of a purely economic character behind a haze of politico-ethic conceptions of "just price" and feudal right. It was in the break-up of feudalism and the coming of the Industrial Revolution, therefore, that the modern economic problem of agriculture emerged—to be a vital issue for Western Europe and a gradually enlarging portion of the rest of the world ever since.

In America, the flood of free land, the spread of new settlements beyond the reach of transportation facilities, the scant use of currency, and the absence of pecuniary emulation where all men were substantially equal and opportunities for spending were few, brought a brief respite from the problem along our frontier of exploitation. But since the latter part of the nineteenth century (and in the older sections, much earlier), the problem of how best to organize agriculture as part of a price-regulated society has been full upon us. Only in proportion as we attain, from year to year, a more adequate comprehension of the constantly changing details of this problem and make

adjustments of our actions and our institutions to fit these evolving needs, can we think ourselves to be even on the road toward its solution.

A. Savage Beginnings

1. THE DOMESTICATION OF ANIMALS[1]

By NICHOLAS JOLY

When we consider the immense difficulties which primitive man must have encountered in the task of subduing an animal so powerful as the wild bull, so swift as the horse, so fierce as the dog in its natural state, we may well wonder how he could tame these wild creatures and render them useful allies and devoted servants. Now that the work is accomplished, nothing seems to us more simple than domestication, but there is nothing voluntary on the part of the animal in this association between the beast and man, his master. The lamb did not become of its own accord a submissive victim, nor did the bull voluntarily submit its neck to the yoke, nor the horse open its mouth to receive the bit. But man has discovered and turned to account in most of the animals he has subjected to his rule an instinct of sociability, existing together with the love of independence, and predisposing them to domestication. Here once more his intelligence created him king; it enabled him to discern among the beasts of the forest those which would be most useful to him by furnishing him with flesh, milk, muscular strength, soft warm fur—all the resources of their instinctive and sagacious faculties. In this respect the work of our early ancestors is so complete that the lapse of many centuries has added but little to the riches acquired by them.

What species of wild animal was first chosen for domestication and at what epoch it was first tamed is a question which, though often discussed, has as yet received no satisfactory answer. Paleontology, however, has lately added another argument in favor of the opinion of those who hold that the dog was the first animal subjected to the dominion of man. Professor Steenstrup has proved that the dog hunted with man and shared his repasts at the remote epoch of the Danish kitchen middens. The eminently sociable disposition of the dog, the innumerable varieties which the species present, and its valuable qualities, natural or acquired, all tend to prove that it was

[1] Adapted from *Man before Metals*, pp. 256–59. (D. Appleton & Co.)

one of the earliest companions of man, whom it has never since abandoned, whom it has everywhere followed.

Townsend has said:

> The dog is the greatest conquest man ever made, if M. Buffon will allow me to say so. The dog is the first element in human progress. Without the dog man would have been condemned to vegetate eternally in the swaddling clothes of savagery. It was the dog that effected the passage of human society from the savage to the patriarchal state, in making possible the guardianship of the flock. Without the dog there could be no flocks and herds; without the flock there is no assured livelihood, no leg of mutton, no roast beef, no wool, no blanket, no time to spare; and, consequently, no astronomical observations, no science, no industry.

There is a great deal of truth in this ingenious trifling. Once subjected to the all-powerful influence of man, aided by the dog, and transported by him into all climates, our animals, slaves at first, and at last domestic, have undergone in the successive ages a series of modifications in outward form, size, and the proportions of their limbs, in their fur and skin, in their interior organs and their functions, in their instincts and intelligence. The history of these wonderful and almost infinite varieties has been treated by a master hand in Darwin's important work, *Animals and Plants under Domestication.* This book shows how far the power of man over animated nature can extend; it treats of the infinite varieties of breeds of dogs, horses, oxen, sheep, pigs, fowls, pigeons, etc., which man has created, and still creates, for use or to gratify his caprice. Compare the Newfoundland dog with the King Charles spaniel; the Arab horse, so swift in its course, with the heavy but powerful dray horse; the bison of America, with its monstrous head, with our Breton or Alderney cow; the ancona sheep of Massachusetts with the Leicester or merino breed, and say whether man is not also a creator. The list would be endless if we came to consider the instincts acquired or lost, the fecundity increased or diminished, the diet completely changed, the acclimatization and naturalization of exotic species, etc.

The greater number of our domestic animals, commonly regarded as originally natives of Central Asia, are on the contrary of European origin. Their primitive stock, whether single or multiple, goes back in the case of many of them to a remote geological antiquity; that is to say, at least as far as the fourth epoch. Of course, this same original stock may exist no longer, except in a fossil state. That of the dog, of the horse, of the ox, etc., are cases in point. We are so

accustomed to look to the East for the solution of similar problems that we forget what lies near at hand and may furnish a simpler explanation. We do not, however, deny that several species or varieties, very similar to our own domestic ones, may have come to us from the East, and have formed half-breeds and different varieties by mingling with the breeds already existing in Europe. A few animals only came to us from Africa and a few have been imported from America at a comparatively recent epoch. These are the guinea-pig, the turkey, the musk duck, the Canada goose, and the cochineal from Nepal.

NOTE.—More recent and more detailed treatment of this theme may be found in the *Twenty-seventh Annual Report of the Bureau of Animal Industry* (see p. 125 and p. 187). In the first of these articles, Professor J. Cossar Ewart presents evidence that "the turbary sheep, which seems to have accompanied Neolithic man in all his wanderings, was evolved in Turkestan from the native wild urial, that from Turkestan it found its way into Europe, where it was widely distributed in prehistoric times. It was characterized by thin tall legs and horns like a goat, but there existed also a sheep with large curved horns and a four-horned sheep. Professor Fairfield Osborn says that British shorthorn cattle are descended from an indigenous occidental race, domesticated in Europe by the Neolithic man. While the naturalists as a rule agree that the urus was the only wild ox in Europe and that an eastern derivation of European cattle is in the highest degree improbable, some believe our modern breeds are descended from varieties originally domesticated in Asia. In England and America many naturalists now believe (1) that domestic horses have sprung from several wild species probably connected by several lines of descent with three-hoofed species of the Miocene period, and (2) that while some of the wild ancestors were adapted for living in the vicinity of forests and upland valleys, others were adapted for a steppe, plateau, or desert life. The small, stout horse of the ancient Germans is doubtless a true forest type, and it is probable that all modern dray horses with round hind quarters have inherited their upright shoulders, large cannon bones, and low-set-on tail from forest ancestors. The plateau or desert type was distinguished for speed, and this quality we see preserved in the desert Arab strain, and through Barb and Arab blood has contributed to the making of the modern English race horse. The horse of the steppe type had a remarkable ability to clear obstacles when alarmed or when

in search of fresh pastures. Probably Irish hunters are mainly indebted to ancestors of this type for their remarkable leaping powers. A fourth type should be added—a horse quite fifteen hands high, in build not unlike the modern race horse, fleet but probably characterized by an indomitable disposition. This Siwalik type derives his name from the fact that it appeared among the Siwalik Hills of India, and it is the oldest known true horse."—EDITOR.

2. THE BEGINNINGS OF PLANT CULTIVATION[1]

BY A. P. DE CANDOLLE

In the progress of civilization the beginnings are usually feeble, obscure, and limited. There are reasons why this should be the case with the first attempts at agriculture or horticulture. Between the custom of gathering wild fruits, grain, and roots and that of the regular cultivation of the plants which produce them there are several steps. A family may scatter seeds around its dwelling, and provide itself the next year with the same products in the forest. Certain trees may exist near a dwelling without our knowing whether they were planted, or whether the hut was built beside them in order to profit by them. War and the chase often interrupt attempts at cultivation. Rivalry and mistrust cause the imitation of one tribe by another to make but slow progress. If some great personage command the cultivation of a plant, and institute some ceremony to show its utility, it is probably because obscure and unknown men have previously spoken of it, and that successful experiments have already been made. A longer or shorter succession of local and short-lived experiments must have occurred before such a display, which is calculated to impress an already numerous public. It is easy to understand that there must have been determining causes to excite these attempts, to renew them, to make them successful.

The first cause is that such or such a plant, offering some of those advantages which all men seek, must be within reach. The lowest savages know the plants of their country; but the example of the Australians and Patagonians shows that if they do not consider them productive and easy to rear, they do not entertain the idea of cultivating them. Other conditions are sufficiently evident: a not too rigorous climate; in hot countries, the moderate duration of drought;

[1] Adapted from *The Origin of Cultivated Plants*, pp. 1–7, 325. (D. Appleton & Co.)

some degree of security and settlement; lastly, a pressing necessity, due to insufficient resources in fishing, hunting, or in the production of indigenous and nutritious plants, such as the chestnut, the date-palm, the banana, or the breadfruit tree. When men can live without work it is what they like best. Besides, the element of hazard in hunting and fishing attracts primitive, and sometimes civilized, man more than the rude and regular labor of cultivation.

I return to the species which savages are disposed to cultivate. They sometimes find them in their own country, but often receive them from neighboring peoples more favored than themselves by natural conditions, or already possessed of some sort of civilization. When a people is not established on an island, or in some place difficult of access, they soon adopt certain plants, discovered elsewhere, of which the advantage is evident, and are thereby diverted from the cultivation of poorer species of their own country. History shows us that wheat, maize, the sweet potato, several species of the genus *Panicum*, tobacco, and other plants, especially annuals, were widely diffused before the historical period. These useful species opposed and arrested the timid attempts made here and there on less productive or less agreeable plants. And we see in our own day, in various countries, barley replaced by wheat, maize preferred to buckwheat and many kinds of millet, while some vegetables and other cultivated plants fall into disrepute, because other species, sometimes brought from a distance, are more profitable. The difference in value, however great, which is found among plants already improved by culture is less than that which exists between cultivated plants and others completely wild. Selection, that great factor which Darwin has had the merit of introducing so happily into science, plays an important part when once agriculture is established; but in every epoch, and especially in its earliest stage, the choice of species is more important than the selection of varieties.

The various causes which favor or obstruct the beginnings of agriculture explain why certain regions have been for thousands of years peopled by husbandmen, while others are still inhabited by nomadic tribes. It is clear that, owing to their well-known qualities and to the favorable conditions of climate, it was at an early period found easy to cultivate rice and several leguminous plants in Southern Asia, barley and wheat in Mesopotamia and in Egypt, several species of *Panicum* in Africa, maize, the potato, the sweet potato, and manioc in America. Centers were thus formed whence the most useful

species were diffused. In the north of Asia, of Europe, and of America the climate is unfavorable and the indigenous plants are unproductive; but as hunting and fishing offered their resources, agriculture must have been introduced there late, and it was possible to dispense with the good species of the south without great suffering. It was different in Australia, Patagonia, and even in the south of Africa. They were out of reach of the plants of the temperate region in our hemisphere, and the indigenous species were very poor. It is not merely the want of intelligence or security that has prevented the inhabitants from cultivating them. Europeans established in these countries for a hundred years have cultivated only a single species, and that an insignificant green vegetable.

In spite of the obscurity of the beginnings of cultivation in each region, it is certain that they occurred at very different periods. One of the most ancient examples of cultivated plants is in a drawing representing figs, found in Egypt in the pyramid of Gizeh—probably four thousand years old. This people must then have had an established agriculture dating back some centuries at least. Agriculture appears to be as ancient in China as in Egypt, and the constant relations between Egypt and Mesopotamia lead us to suppose that an almost contemporaneous cultivation existed in the valleys of the Euphrates and the Nile.

The ancient Egyptians and the Phoenicians propagated many plants in the region of the Mediterranean, and the Aryan nations, whose migrations toward Europe began about 2500, or at latest 2000, B.C., carried with them several species already cultivated in Western Asia. Some plants were probably cultivated in Europe and in the north of Africa prior to the Aryan migration. This is shown by names in languages more ancient than the Aryan tongues; for instance, Finn, Basque, Berber, and the speech of the Guanchos of the Canary Isles. However, the remains, called kitchen middens, of ancient Danish dwellings have hitherto furnished no proof of cultivation or any indication of the possession of metal. This absence of metals does not in these northern countries argue a greater antiquity than the age of Pericles, or even the palmy days of the Roman republic. Later, when bronze was known in Sweden—a region far removed from the then civilized countries—agriculture had at length been introduced. Among the remains of that epoch was found a carving of a cart drawn by two oxen and driven by a man. The ancient inhabitants of Eastern Switzerland, at a time when they possessed

instruments of polished stone and no metals, cultivated several plants, some of which were of Asiatic origin. The remains of the lake-dwellers of Austria prove likewise a completely primitive agriculture: no cereals have been found at Laybach and only a single grain of wheat at the Mondstee. The backward condition of agriculture in this eastern part of Europe is contrary to the hypothesis, based on a few words used by ancient historians, that the Aryans sojourned first in the region of the Danube. In spite of this example, agriculture appears in general to have been more ancient in the temperate parts of Europe than we should be inclined to believe from the Greeks, who were disposed to attribute the origin of all progress to their own nation.

In America agriculture is perhaps not quite so ancient as in Asia and Egypt, if we are to judge from the civilization of Mexico and Peru, which does not date even from the first centuries of the Christian era. However, the widespread cultivation of certain plants, such as maize, tobacco, and the sweet potato, argues a considerable antiquity, perhaps two thousand years or thereabouts. History is at fault in this matter and we can only hope to be enlightened by the discoveries of archaeology and geology.

Men have not discovered and cultivated within the last two thousand years a single species which can rival maize, rice, the sweet potato, the potato, the breadfruit, the date cereals, millets, sorghums, the banana, soy. These date from three, four, or five thousand years, perhaps even in some cases six thousand years. The species first cultivated during the Graeco-Roman civilization and later, nearly all answer to more varied or more refined needs. A great dispersion of the ancient species from one country to another took place, and at the same time a selection of the best varieties developed in each species. The introductions within the last two thousand years took place in a very irregular and intermittent manner. I cannot quote a single species cultivated for the first time after that date by the Chinese, the greatest cultivators of ancient times. The peoples of Southern and Western Asia innovated in a certain degree by cultivating the buckwheats, several cucurbitaceae, a few alliums, etc. In Europe, the Romans and several peoples in the Middle Ages introduced the cultivation of a few vegetables and fruits, and that of several fodders. In Africa, a few species were then first cultivated separately. After the voyages of Vasco da Gama and of Columbus a rapid diffusion took place of the species already cultivated in either

hemisphere. These transports continued during three centuries without any introduction of new species into cultivation. We must come to the middle of the present century to find new cultures of any value from the utilitarian point of view, such as the *Eucalyptus globulus* of Australia and the *Cinchonas* of South America. From these data and reflections it is probable that at the end of the nineteenth century men will cultivate on a large scale and for use about three hundred species. This is a small proportion of the one hundred and twenty or one hundred and forty thousand in the vegetable kingdom; but in the animal world the proportion of creatures subject to the will of man is far smaller. There are not perhaps more than two hundred species of domestic animals—that is, reared for use—and the animal kingdom reckons millions of species. Doubtless the number of species of animals and vegetables which may be reared or cultivated for pleasure or curiosity is very large: witness menageries and zoölogical and botanical gardens. But I am speaking here of useful plants and animals in general and customary employment.

B. The Pastoral Stage

3. THE FLOCKS AND HERDS OF PALESTINE

Gen. 13:1–12

And Abram went up out of Egypt, he, and his wife, and all that he had, and Lot with him, into the south. And Abram *was* very rich in cattle, in silver, and in gold. And he went on his journeys from the south even to Beth-el, unto the place where his tent had been at the beginning, between Beth-el and Hai; unto the place of the altar, which he had made there at the first: and there Abram called on the name of the LORD. And Lot also, which went with Abram, had flocks, and herds, and tents. And the land was not able to bear them, that they might dwell together: for their substance was great, so that they could not dwell together. And there was a strife between the herdmen of Abram's cattle and the herdmen of Lot's cattle: and the Canaanite and the Perizzite dwelt then in the land. And Abram said unto Lot, Let there be no strife, I pray thee, between me and thee, and between my herdmen and thy herdmen; for we *be* brethren. *Is* not the whole land before thee? separate thyself, I pray thee, from me: if *thou wilt take* the left hand, then I will go to the right; or if *thou depart* to the right hand, then I will go to the left. And Lot lifted up his eyes, and beheld all the plain of Jordan, that it *was* well

watered every where, before the LORD destroyed Sodom and Gomorrah, *even* as the garden of the LORD, like the land of Egypt, as thou comest unto Zoar. Then Lot chose him all the plain of Jordan; and Lot journeyed east: and they separated themselves the one from the other. Abram dwelt in the land of Canaan, and Lot dwelt in the cities of the plain, and pitched *his* tent toward Sodom.[1]

4. EARLY PASTORAL LIFE IN NORTHERN EUROPE[2]

BY WILLIAM CUNNINGHAM

The earliest evidence which we possess in regard to those Germans among whom the English tribes were included dates from a time when they had not completely emerged from a nomadic state; apart from this direct evidence we might have inferred on general grounds that they must have pursued a pastoral life at some period. The economy of any tribes who lived in the distant home of the Aryan race must have been of this character, while the wandering of tribes—not the incursion of a horde of conquerors—is scarcely intelligible unless we suppose them accompanied by their flocks and herds. One most important occasion for the wandering of these tribes must have been a lack of fodder, and they would take the direction which presented the least obstacles to their continued livelihood from their herds. Level plains and river courses would offer favorite lines of progress; while the rapid multiplication, which seems to have continued in the regions from which they came, would always urge an onward movement. But at length they would find themselves opposed by obstacles which prevented any farther advance; there were no means of transport by which a nomadic people could convey their herds across the German Ocean, while the Roman armies prevented the farther progress of the barbarian tribes, as tribes. In some such way as this the English were forced to settle down on the strip of land in Frisia, where they were sooner or later compelled to eke out their subsistence from their herds by means of tillage, and from which they subsequently emerged to conquer Britain.

[1] It is evident that beginnings of settled agriculture were made at an early day. Even upon the occasion of the visit of Abraham's servant seeking a wife for Isaac, the maid at the well says: "We have both straw and provender enough and room to lodge in." References to the threshing of grain, the cultivation of vineyards, and the care of olive trees are also numerous in the Old Testament. —EDITOR.

[2] *Growth of English Industry and Commerce*, pp. 28–30. (Cambridge University Press.)

From the descriptions which we read of nomadic peoples in the present day, we can form a fairly clear idea of the economy of similar tribes long ago. In the management of the herd, in successful breeding and training, there is opportunity for the constant exercise of forethought and skill. The land over which the cattle range is not appropriated. Each family, however, possesses its own herd; and there may also be an understanding, for mutual convenience, between two septs or families, as to the runs which their cattle are to occupy respectively. When we bear in mind these facts as to the general character of such tribes, we shall be in a better position for interpreting the hints which Caesar gives us in regard to some matters of detail.

They were, as he tells us, mostly occupied with hunting and warfare, and they derived subsistence from their herds and the spoils of the chase; but they hardly devoted themselves to agriculture at all. Under these circumstances it is quite clear that the assignment of land which Caesar describes must either have been forest for game or pasturage for cattle; in any case, it was waste land they wished to use, as they could have little interest in securing possession of fields that were suitable for tillage. What they wished to have was the right to use a well-stocked waste, and the lands thus assigned were common to the members of a particular family or sept for the time being, and were not held in severalty.

C. Agricultural Development of the Ancient Nations

5. GREEK HUSBANDRY[1]

By PERCY GARDNER and F. BYRON JEVONS

The Achaeans, as they come before us in the Homeric poems, are rather a pastoral than an agricultural race. It is in their herds of cattle, sheep, and swine, rather than in the produce of their lands, that the wealth of the heroic kings consisted. It was cattle which furnished them with a measure of value; and cattle, together with slaves, were the most valuable spoil which they secured in their military and piratical expeditions. Thucydides traces the same lines as Homer. In early times, he tells us, the insecurity of property was too great to allow of the planting of trees, which would of course lie at the mercy of an invading enemy. And although men tilled the

[1] Adapted from *Manual of Greek Antiquities*, pp. 370–76. (Copyright by Charles Griffen & Co., Ltd., London.)

ground, the harvest would very often fall to the foe, whereas cattle could on an alarm be driven to a place of safety. We read of kings' sons who were herdsmen and shepherds, such as Paris and Ganymedes and Anchises. In some instances, too, they are represented as engaged in agriculture. In the stately scenes of the Homeric shield, while the reapers cut and bind the corn the master stands by, leaning on his staff and rejoicing in his heart. But the aged Laertes, father of Odysseus, is found by that hero clad in skins labouring in digging his own land. And the story goes that when the chiefs came to fetch Odysseus himself to the war against Troy they found him, like Cincinnatus, occupied in ploughing.

It is probable that the downfall of the Achaean race was followed by a time of greater simplicity, when the aristocracy of the Greek tribes lived on their estates in the midst of slaves and retainers, as did the wealthy inhabitants of Elis even in the time of the Achaean League. But Greek civic life began to develop with irresistible attraction. The rich thronged into cities, and left the work of their farms to bailiffs and slaves. There were in particular two states wherein the country life fell into the background—Athens and Sparta. But even at Athens, although the witty and luxurious citizens ridiculed the yeoman as a lout, they could not deny his solid virtues.

In the rural life of Greece we find traces of archaic customs which belonged to the entire Aryan race. The house, together with the field surrounding it, which was marked off by terminal stones, was the original domain of the self-contained Aryan family, within which the head of each family was supreme. Hence the possession was long considered necessary for the citizen, and always until the present day property in land has been more highly valued and has conferred greater distinction than any other class of wealth.

As a whole, Greece is a country by no means favourable to agriculture. The country is mostly rocky, barren, and uneven, especially unsuited for large farms. The system of farming was that adapted to peasant proprietors or yeomen. There can be no doubt that agriculture in Attica suffered more and more as time went on, though to a less degree than that of Italy in imperial times, from the competition of richer soils. Great cargoes of corn from Egypt and Sicily and the Black Sea constantly arrived in the Piraeus, and the people of Athens learned the fatal lesson that it was easier to buy agricultural produce with money wrung from the allies or extracted from the mines of Laurium than to grow it on the rugged soil around Athens. Grass-

lands in Greece were mostly used for pasture, and not kept for hay. With regard to their live stock, the Greeks from very early times took pains with the breed, and endeavored to improve it. Thus we hear that Polycrates imported into Samos sheep from Athens and Miletus, and dogs from Lacedaemon and Epirus. The horse was not used for purposes of farming, and was at all times somewhat scarce in Greece. Oxen, sheep, and goats found abundant pasture in early times in Greece. The shepherds were very numerous in proportion to the sheep they tended, one to fifty, or at least one to a hundred, the labour of slaves being very cheap and very ineffective.

6. CONTEMPORARY ACCOUNTS OF ROMAN FARMING

a) By MARCUS PORCIUS CATO[1]

In buying a farm, notice how many wine presses and jars there are; where they are lacking one can infer what yield there is. However, it is not the amount of equipment but what is accomplished with it that counts. Where there are few implements the farm will not be expensive to operate. One should realize that with a farm not less than with a man, no matter how much it produces, little gain will be left if the farm has a habit of spending.

If you have bought a farm of one hundred *jugera*, in the best location, it should be planted as follows: first a vineyard, if it promises to yield well, second a watered garden, third an oiser bed, fourth an olive orchard, fifth a meadow, sixth a grain field, seventh a woodlot, eighth a cultivated orchard, and ninth an aocrn grove.

As a young man, the farm-owner should plant his land with care, but build only after long reflection. Planting does not require reflection but action. When you have reached the age of thirty-six, then you should build if you have a farm well planted. In building, do not let the farmhouse be insufficient for the farm, or the farm for the house. The farm-owner should have his country home well built, with oil and wine cellar, and many jars, so that he may wait for the highest price; a home, in short, which will be to your profit, your credit, and your reputation.

When the owner has come to the farmhouse and has greeted the household, he should go over the farm that same day if possible; otherwise, the next day. When he finds how the work of cultivation has gone, what tasks are done, what undone, he should call the overseer

[1] Adapted from *De agricultura*, i, ii, iii.

the next day and ask him what work has been done, what remains to do; whether enough has been accomplished for the time spent, and whether he can get the rest done; also what has been harvested of vine, grain, and all the other crops. When there have been rain storms, see how many days, and what work could have been done in this stormy time: washing and pitching the wine jars, cleaning the barn, transferring grain, carrying out the manure and making compost heaps, cleaning the seed, mending old ropes and making new—and the slaves should have mended their own rough garments and hoods. On feast days the old ditches could have been repaired, the public road worked, brambles cut down, the garden spaded, the meadow cleaned, withes bound, thorn-hedges trimmed, the coarse meal ground, and cleaning done generally. (Not so much cooked food should be given the slaves as when they are working in good weather in open fields.) Then take account of money on hand, grain, and what has been got for fodder; have a reckoning as to wine and oil, what has been sold, what profit it has made, what remains on hand, and what is ready for sale. He should sell the oil if he can get his price, and the wine and grain left over. Let him sell the old oxen, the blemished cattle and sheep, the wool, hides, old wagons and iron tools, old and sick slaves, and whatever else is superfluous. The farm-owner should be a seller, not a buyer.

b) By MARCUS TERENTIUS VARRO[2]

When we had sat down Agrasius said, "You who have travelled through many lands, have you seen any better cultivated than Italy?" "I think at least," said Agrius, "that there is none so completely cultivated. What useful product is there that does not grow, or more, grow at its best in Italy? What spelt shall I compare with the Campanian? What wheat with the Apulian? What wine with that from Falernum, or oil with that of Venafrum? Is not Italy so planted with trees that it all seems one orchard?

"Two things in particular Italians seem to consider in farming, whether enough crops can be raised in proportion to the expense and labor, and whether the place is healthful or not. Anyone who neglects either of these points and wants to cultivate the place nevertheless is insane, and should be handed over to his kinsman and family, for

[2] Adapted from *Rerum rusticarum libri tres*, Book i, chaps. 2, 3, 4, 22; Book ii, chap. 1. For both these Latin translations the editor is indebted to Dr. J. Leonard Hancock, of the Department of Ancient Languages of the University of Arkansas.

no sane man should be willing to put outlay and expense upon care of a farm if he sees that he cannot get a return or, though he can get returns, if he sees that these are likely to be lost by reason of a bad climate."

"First," said Scrofa, "we must decide whether only things planted in the ground are included in agriculture, or also those which are driven into the country, as sheep and cattle."

"Well," said Stolo, "grazing in general, which is joined by many with agriculture, seems to me to belong to the shepherd rather than the farmer. And so the men put in charge of the respective tasks are called by different names even, for one is called a farm-er, the other a herds-man. The farmer [*vilicus*] is put there to cultivate the ground and is named from the farmhouse [*villa*], since to this he takes the crops and from this they are carried when they are sold."

"Certainly," said Fundanius, "grazing and agriculture are different things, but related, just as the right pipe of the tibia is different from the left, yet is in a manner joined with it, since the one carries the air, the other gives the accompaniment of the same song."

"And indeed you might add," said I, "that the shepherd's life carries the lead and the farmer's furnishes the accompaniment, and this on the authority of a very learned man, Dicaearchus, who in describing the life of Greece from its beginnings tells us that in early times men led the life of shepherds and did not know even how to plough the ground or plant trees or prune them. A step lower in the descent of life agriculture was begun; and so it played a second part to the shepherd life, because it is lower, or later, as the left pipe is lower than the openings of the right.

"First of all, agriculture is not only an art, but one essential and important. It is the knowledge of what must be sowed and cultivated in every field, and how the land may continually produce the greatest crops. The elements on which it is based are the same that Ennius says are those of the universe—water, earth, air, and sun. These elements must be considered before you put in your seed, which gives the beginning of fruitage. Starting from this, farmers should work toward two goals—utility and pleasure. The one seeks profit, the other enjoyment; but he should give first place to that which is useful above that which offers pleasure.

"Never buy any of the utensils which can be made on the farm by the servants. Tools which cannot be produced on the estate, if

they are bought with an eye to usefulness rather than beauty, will not by their cost diminish your profit. Cato writes that the man who has an olive orchard of 240 *jugera* should arrange to use five sets of tools and receptacles for oil, which he enumerates in detail—as those of bronze, kettle, pitchers, and pots; those of wood and iron, as three large wagons, six ploughs with their shares, four manure boxes, and the like; and of iron implements the kind and the number necessary, as eight pitchforks, the same number of hoes, half as many shovels, etc. He gives another rule for implements in a vineyard: if it be one hundred *jugera*, one should have on hand three sets of tools for the winepress, covered jars to hold 800 *cullei*, twenty grape hampers, twenty grain hampers, and other things of this sort. Others, indeed, advise less of these, but I think he gave so large a number of *cullei* so that one would not be compelled to sell the wine each year. For old wine is worth more than new and the same wine worth more at one time than another.

"It is not without reason that those great men placed the Romans who lived in the country above those of the city. They thought that those who sat about in town were idlers compared with those who tilled the fields. Accordingly they so divided the year that only every eighth day did they tend to city business, leaving the other seven for work on the farm. As long as they kept up this practice they attained both ends, that of having farms very fruitful through careful cultivation, and that of being themselves of sounder health and not needing the city gymnasiums of the Greeks. And so, since now for the most part our heads of families have crept within the city walls, leaving the pruning hook and the plough, and prefer to ply their hands in theater and circus rather than in the corn and the vines, we let out contracts for importing grain that we may get our fill from Africa and Sardinia, and we load our ships with the vintage of the islands Cos and Chios. Thus in the very land where shepherds, who founded the city, taught their children agriculture, there the children of these men in their greed have, in violation of laws, made cornfields into pasture, unaware that agriculture and pasturing are not the same. For shepherd and ploughman are quite different, and even if he pastures his herd on farm land the herdsman is not the same as the ox-driver. Yet the connection between the two is close, because it is far more advisable for the farm-owner to use the fodder on the farm as pasturage than to sell it, and because manure is best fitted for products of the earth and cattle are especially convenient for producing this.

Hence the farm-owner should engage in both pursuits, agriculture and grazing and even that of pasturing animals for the hunt."

"Well, then," said Scofa, "the science of breeding and feeding cattle means the getting as much profit as possible from them. Indeed, it is from them that money gets its name, for cattle [*pecus*] are the foundation of all wealth [*pecunia*]. This science has nine parts, which fall into three divisions: one having to do with smaller cattle, of which there are three kinds, sheep, goats, and swine; the second concerning larger cattle, which are also naturally divided into three kinds, cows, asses, and horses; the third involving those things in cattle breeding which are not raised to get a profit out of them, but because of the science or as a result of it, namely, mules, dogs, and shepherds. The second point is a knowledge of the form of each kind of cattle; for it makes a great difference in the profit what sort each one is. So men buy cows with black horns rather than with white, large goats rather than small ones, and pigs with long bodies, provided they have small heads. The third point is the question of the strain to be desired. In this connection Arcadian asses are celebrated in Greece and those from Reate in Italy; so much so, indeed, that in my memory an ass went for 60,000 sesterces and a team-of-four at Rome were valued at four hundred thousand."

D. The Middle Ages

7. THE DISCOURAGEMENT OF AGRICULTURE IN EUROPE AFTER THE FALL OF THE ROMAN EMPIRE[1]

By ADAM SMITH

When the German and Scythian nations overran the western provinces of the Roman Empire, the confusions which followed so great a revolution lasted for several centuries. The towns were deserted, and the country was left uncultivated; and the western provinces of Europe, which had enjoyed a considerable degree of opulence under the Roman Empire, sank into the lowest state of poverty and barbarism. During the continuance of those confusions, the chiefs and principal leaders of those nations acquired, or usurped to themselves, the greater part of the land of those countries. A great part of them was uncultivated; but no part of them, whether cultivated or uncultivated, was left without a proprietor. All of them were engrossed, and the greater part by a few great proprietors.

[1] Adapted from *Wealth of Nations*, Book III, chap. ii.

The original engrossing of uncultivated lands, though a great, might have been but a transitory evil. They might soon have been divided again, and broken into small parcels, either by succession or by alienation. The law of primogeniture hindered them from being divided by succession; the introduction of entails prevented their being broken into small parcels by alienation.

It seldom happens, however, that a great proprietor is a great improver. In the disorderly times that gave birth to those barbarous institutions, the great proprietor was sufficiently employed in defending his own territories, or in extending his jurisdiction and authority over those of his neighbours. He had no leisure to attend to the cultivation and improvement of land. When the establishment of law and order afforded him this leisure, he often wanted the inclination, and almost always the requisite abilities. If the expense of his house and person either equalled or exceeded his revenue, as it did very frequently, he had no stock to employ in this manner. If he was an economist, he generally found it more profitable to employ his annual savings in new purchases than in the improvement of his old estate. To improve land with profit, like all other commercial projects, requires an exact attention to small savings and small gains, of which a man born to a great fortune, even though naturally frugal, is very seldom capable. The situation of such a person naturally disposes him to attend rather to ornament, which pleases his fancy, than to profit, for which he has so little occasion.

If little improvement was to be expected from such great proprietors, still less was to be hoped for from those who occupied the land under them. In the ancient state of Europe, the occupiers of land were all tenants at will. They were all, or almost all, slaves, but their slavery was of a milder kind than that known among the ancient Greeks and Romans, or even in our West Indian colonies. They were supposed to belong more directly to the land than to their master. They could, therefore, be sold with it, but not separately. They could marry, provided it was with the consent of their master; and he could not afterward dissolve the marriage by selling the man and wife to different persons. They were not, however, capable of acquiring property. Whatever they acquired was acquired to their master, and he could take it from them at pleasure. Whatever cultivation and improvement could be carried on by means of such slaves was properly carried on by their master. It was at his expense. The seed, the cattle, and the instruments of husbandry were all his. It

was for his benefit. Such slaves could acquire nothing but their daily maintenance. It was properly the proprietor himself, therefore, that occupied his own lands and cultivated them by his own bondmen.

But if great improvements are seldom to be expected from great proprietors, they are least of all to be expected when they employ slaves for their workmen. The experience of all ages and nations, I believe, demonstrates that the work done by slaves, though it appears to cost only their maintenance, is in the end the dearest of any. A person who can acquire no property can have no other interest but to eat as much and to labour as little as possible. Whatever work he does beyond what is sufficient to purchase his own maintenance can be squeezed out of him by violence only, and not by any interest of his own. To the slave cultivators of ancient times succeeded gradually a species of farmers, known at present in France by the name of *metayers*. They have been so long in disuse in England that I know no English name for them at present. The proprietor furnished them with the seed, cattle, and instruments of husbandry—the whole stock, in short, necessary for cultivating the farm. The produce was divided equally between the proprietor and the farmer, after setting aside what was judged necessary for keeping up the stock, which was restored to the proprietor when the farmer either quitted or was turned out of the farm. Such tenants, being freemen, are capable of acquiring property; and having a certain proportion of the produce of the land, they have a plain interest that the whole produce should be as great as possible, in order that their own proportion may be so. It could never, however, be the interest, even of this last species of cultivators, to lay out, in the improvement of the land, any part of the little stock which they might save from their own share of the produce, because the landlord, who laid out nothing, was to get one-half of whatever it produced. The tithe, which is but a tenth of the produce, is found to be a very great hindrance to improvement. A tax, therefore, which amounted to one-half must have been an effectual bar to it. It might be the interest of the *metayer* to make the land produce as much as could be brought out of it by means of the stock furnished by the proprietor; but it could never be his interest to mix any part of his own with it.

To this species of tenantry succeeded, though by very slow degrees, farmers, properly so called, who cultivated the land with their own stock, paying a certain rent to the landlord. When such farmers have a lease for a term of years, they may sometimes find it to their interest to lay out part of their capital for the further

improvement of the farm, because they may sometimes expect to recover it, with a large profit, before the expiration of the lease.

The proprietors of land were anciently the legislators of every part of Europe. The laws relating to land, therefore, were all calculated for what they supposed the interest of the proprietor. It was for his interest, they had imagined, that no lease granted by any of his predecessors should hinder him from enjoying, during a long term of years, the full value of his land. Avarice and injustice are always shortsighted, and they did not see how much this regulation must obstruct improvement, and thereby hurt, in the long run, the real interest of the landlord.

The farmers, too, besides paying the rent, were bound to perform a great number of services to the landlord; and public services to which the yeomanry were bound were not less arbitrary than the private ones. To make and maintain the highroads, a service which still exists, I believe, everywhere, though with different degrees of oppression in different countries, was not the only one. When the king's troops, when his household, or his officers of any kind passed through any part of the country, the yeomanry were bound to provide them with horses, carriages, and provisions, at a price regulated by the purveyor. The public taxes, to which they were subject, were as irregular and oppressive as the services.

Under all these discouragements, little improvement could be expected from the occupiers of land. The ancient policy of Europe was, over and above all this, unfavourable to the improvement and cultivation of land, whether carried on by the proprietor or by the farmer; first, by the general prohibition of the exportation of corn, without a special license, which seems to have been a very universal regulation; and, secondly, by the restraints that were laid upon the inland commerce, not only of corn, but of almost every other part of the produce of the farm, by the absurd laws against engrossers, forestallers, and regraters, and by the privileges of fairs and markets.

8. MANORIAL HUSBANDRY[1]

By ROWLAND E. PROTHERO

The most primitive form of agriculture in England was that known as "wild field-grass" husbandry. Joint occupation and joint tillage were probably its characteristics. Fresh tracts of grass were

[1] Adapted from *English Farming, Past and Present*, pp. 2, 3, 8–18, 26. (Copyright by Longmans, Green, & Co., London. Used by permission of the publisher.)

successively taken in, ploughed, and tilled for corn. As the soil became exhausted, they reverted to pasture. Such a practice may belong to some portion of the Celtic race or to nomadic stages of civilization.

This "wild field-grass" husbandry was displaced in most parts of England by the permanent separation of arable from pasture land. This fixed division of tillage and grass, introduced into this country possibly by people accustomed, like the Romans or the Anglo-Saxons, to a drier and less variable climate, became the basis of the agricultural organization of the mediaeval manor. On it also were founded the essential features of those village communities which at one time tilled two-thirds of the cultivated soil of England, survived the criticism of Fitzherbert in the sixteenth century, outlived the onslaught of Arthur Young in the eighteenth century, clung to the land in spite of thousands of enclosure acts, and were carried to the New World by the Pilgrim Fathers.

The crops grown were, as winter seeds, wheat and rye, and, as spring seeds, oats, barley, beans, peas, or vetches. Flax, hemp, and saffron were locally raised in separate plots. Roots, clover, and artificial grasses were still unknown. Rotations of crops, as they are now understood, were therefore impossible. The soil was rested by fallowing the one-half, or the one-third, of the arable land, required by the two- or the three-course system. On the tenant's land, rye was the chief grain crop, and rye was then the breadstuff of the English peasantry, as it still is in Northern Europe. Barley was the drink-corn, as rye was the bread-corn, of the Middle Ages. In the north, oats were extensively cultivated but they were gray-awned, thin, and poor.

The ploughings were performed, and the teams supplied and driven, partly by the servants of the demesne, partly by the tenants. Sometimes ploughmen seemed to have been hired. The harrowings were similarly provided for, and the harrow, often a hawthorn tree, weighted on its upper side with logs, was supplied from the lord's waste. Here also harrowers seem to have been sometimes specially hired. In this case they possibly provided their own home-constructed implements with sharp points or teeth like the modern type of harrow. When the fallows were first broken up, as was then the practice, in March, or when the land was prepared for barley, the ground was often so hard that the clods had to be subsequently broken. For this purpose the ploughman, holding the principal hale

of the plough in his left hand, carried in his right a "clotting beetle," or "maul," such as that which is depicted in the Cotton MSS. A "Dover-court beetle" was a necessary tool in the days of Tusser; and Plot, whose *Natural History of Oxfordshire* appeared in the seventeenth century, recommends its use after the land was harrowed.

The amount of wheat, rye, beans, and peas usually sown to the acre was only two bushels; and of oats and, strangely enough, of barley, four bushels. The yield of wheat rarely exceeded fivefold, or ten bushels to the acre; that of leguminous crops ranged from three- to sixfold, or from six to twelve bushels to the acre; that of oats and barley varied from three- to fourfold, or from twelve to sixteen bushels to the acre. Considerable care was exercised in the choice and change of the seed-corn, which was often one of the produce-rents of the tenants. Wheat rarely followed a spring grain crop. The most important crops of the farm were the corn crops of wheat, rye, and barley, which were raised for human food and drink. For such ready money as he needed, the lord looked mainly to the produce of his live stock. For their consumption were grown the remaining crops—the hay, beans, peas, and oats; though oats were not only used for human food, but in some districts were brewed into inferior beer.

Horse-farms appear in some estate accounts; but they probably supplied the "great horse" used for military purposes. As a rule, oxen were preferred to horses for farm work. Though horses worked more quickly when the ploughman allowed them to do so, they pulled less steadily, and sudden strains severely tested the primitive plough-gear. On hard ground they did less work, and only when the land was stony had they any advantage. Economical reasons further explain the preference for oxen. From St. Luke's Day (October 18) to April, both horses and oxen were kept in the stalls. During these twenty-five weeks, neither could graze, and Walter of Henley calculates that the winter-keep of a horse cost four times that of an ox. Horses needed more attendance; they required to be rubbed, curried, and dressed. Oxen were less liable to sickness than horses. The harness of the ox, mainly homemade from materials supplied on the estate, was cheaper to provide and repair. Shod only on the forefeet, the shoeing of the ox cost less than that of the horse. When either horse or ox was past work, the profit of the one lay in his hide; of the other, not in his hide, but the larder: the ox was "mannes meat when dead, while the horse is carrion."

Cattle were seldom fatted even for the tables of the rich; oxen were valued for their power of draught, cows for their milk. It may, indeed, be said that fresh butcher's meat was rarely eaten, and that, if it was, it was almost universally grass-fed. No winter-keep or feeding stuff was available; not even carrots or parsnips were known. The commons, generally unstinted, carried as much stock as could keep skin and bone together in the winter, and the lord could not only turn on them his own sheep and cattle, but license strangers for money payments to do the same. Even if the commons were stinted, the margin was too bare to mean abundance. The best pastures were either in the lord's own hands, and were saved by him at the expense of the commons, or were let out to individuals in separate occupations. Even among these superior feeding-grounds, there were few enclosures which would fatten a bullock. At the wane of the summer the cattle had the aftermath of the hay meadows, and the stubble and haulm of the arable lands. During this season they were at their best. They only survived the winter months in a state of semi-starvation on hay, straw, and tree-loppings. It was, therefore, the practice at the end of June to draft the aged cows, worn-out oxen, and toothless sheep, or "crones," prepare them as far as possible for the butcher, slaughter them in the autumn, and either eat them fresh or throw them into the powdering tub to be salted for winter consumption.

The dairy produce was a greater source of money revenue, though the home consumption of cheese must have been very large. But the management was necessarily controlled, like the management of the stock, by the winter scarcity. The yield of a cow during the twenty-four weeks from the middle of April to Michaelmas was estimated at four-fifths of her total annual yield.

Sheep were the sheet anchor of farming. But it was not for their mutton, or for their milk, or even for their skins, that they were chiefly valued. Already the mediaeval agriculturist took his seat on the wool-sack. As a marketable commodity, both at home and abroad, English long wool always commanded a price. It was less perishable than corn, and more easily transported even on the worst of roads. From Martinmas to Easter sheep were kept in houses, or in movable folds of wooden hurdles, thatched at the sides and tops. During these months they were fed on coarse hay or peas-haulm, mixed with wheaten or oaten straw. For the rest of the year they browsed on the land for fallows, in woodland pastures, or on the sheep-commons. Diseases made sheep-farming, in spite of its profits, a risky venture.

Swine were the almost universal live stock of rich and poor. As consumers of refuse and scavengers of the village, they would, on sanitary grounds, have repaid their keepers. But mediaeval pigs profited their owners much, and cost them little. A pig was more profitable than a cow. For the greater part of the year pigs were expected to pick up their own living. When the wastes and woodlands of a manor were extensive, they were, except during three months of the year, self-supporting. They developed the qualities necessary for taking care of themselves. The ordinary pigs of the Middle Ages were long, flat-sided, coarse-boned, lop-eared, omnivorous animals, whose agility was more valuable than their early maturity. "Growth and flesh were the work of time; so also were thickened skin, developed muscles, and increased weight of bone. The styes were often built in the woods, whence the pigs were brought to feed on the arable land only after the crops were cleared, or, at times of exceptional frost, to subsist on the leavings of the threshing-floor. During most months of the year they ranged the woods for roots, wild pears, wild plums, crab apples, sloes, haws, beech mast, and acorns.

The poultry yard was under the care of the dairywoman, who sometimes seems to have had the poultry to farm at so much a head. Ducks are not mentioned in any of the mediaeval treatises on farming, though they appear in the Berkeley accounts of 1321; guinea-fowl and turkeys were unknown. But the number of geese and fowls, and, on important estates, of peacocks and swans, was large, and it was swollen by the produce-rents, which were often paid in poultry and eggs. The author of *Hosbonderie* gives minute instructions as to the produce for which the dairywoman ought to account. "Each goose ought to have five goslings a year"; each hen was to answer for 115 eggs and seven chickens. Besides the poultry yard, the dovecote or pigeon-house was a source of profit to the lord and of loss to the tenant. Prodigious numbers of pigeons were kept. The privilege of keeping a pigeonhouse was confined to manorial lords and jealously guarded, and every manor had its dovecote. The story of the French Revolution shows how bitterly the peasants resented the plunder of their hard-earned crops by the lord's pigeons.

On the outskirts of the arable fields nearest to the village lay one or more "hams" or stinted pastures, in which a regulated number of

live stock might graze, and which therefore supplied superior feed. Besides the open arable fields, the meadows, and the stinted hams, there were the common pastures, fringed by the untilled wastes which were left in their native wildness. These wastes provided fern and heather for litter, bedding, or thatching; small wood for hurdles; tree-loppings for winter browse of live-stock; furze and turves for fuel; large timber for fencing, implements, and building; mast, acorns, and other food for the swine. Most of these smaller rights were made the subject of fixed annual payments to the manorial lord; but the right of cutting fuel was generally attached to the occupation, not only of arable land, but of cottages. The most important part of these lands were the common pastures, which were often the only grass that arable farmers could command for their live stock. They therefore formed an integral and essential part of the village farm. No rights were exercised upon them by the general public. On the contrary, the commons were most jealously guarded by the privileged commoners against the intrusion or encroachments of strangers. The agistment of strange cattle or sheep was strictly prohibited; commoners who turned out more stock than their proper share were "presented" at the manorial courts and fined; cottages erected on the commons were condemned to be pulled down; the area within which swine might feed was carefully limited, and the swine were to be ringed. Those who enjoyed grazing rights were the occupiers of arable land, whose powers of turning out stock were, in theory, proportioned to the area of their arable holdings, and the occupiers of certain cottages, which commanded higher rents in consequence of the privilege. It was on these commons that the cattle and sheep of the village were fed. Every morning the cattle were collected, probably by the sound of a horn, and driven to the commons by the village herdsman along drift ways, which were inclosed on either side by movable or permanent fences to keep the animals from straying onto the arable land. In the evening they were driven back, each animal returning to its own shelter, as the herd passed up the village street. Similarly, the sheep were driven by the village shepherd to the commons by day, and folded at night on the wheat fallows. Sheep were the manure-carriers, and were prized as much for their folding quality as for their fleeces. During winter each commoner was obliged to find hay for his sheep and his own fold, the common shepherd penning and folding them so as gradually to cover the whole area.

9. ORGANIZATION OF THE MANOR[1]

By W. J. ASHLEY

Till nearly the end of the fourteenth century, England was a purely agricultural country. In the eleventh century, and long afterward, the whole country, outside the larger towns, was divided into manors—into districts, that is to say, in each of which one person, called the *lord*, possessed certain important and valuable rights over all the other inhabitants.

Let us picture to ourselves an eleventh-century manor in Middle or Southern England. There was a village street, and along each side of it the houses of the cultivators of the soil, with little yards around them; as yet there were no scattered farmhouses, such as were to appear later. Stretching away from the village was the arable land, divided usually into three fields, sown one with wheat or rye, one with oats or barley, while one was left fallow. The fields were again subdivided into what were usually called "furlongs," and each furlong into acre or half-acre strips, separated, not by hedges, but by "balks" of unploughed turf; and these strips were divided among the cultivators in such a way that each man's holding was made up of strips scattered up and down the three fields, and no man held two adjoining pieces. Each individual holder was bound to cultivate his strips in accordance with the rotation of crops observed by his neighbours. Besides the arable fields there were also meadows, enclosed for hay-harvest, and divided into portions by lot or rotation or custom, and after hay-harvest thrown open again for the cattle to pasture upon. In most cases there was also some permanent pasture or wood, into which the cattle were turned, either "without stint" or in numbers proportioned to the extent of each man's holding.

In a manor the land was regarded as the property, not of the cultivators, but of a lord. It was divided into that part cultivated for the immediate benefit of the lord, the *demesne* or *inland*, and that held of him by tenants, the land in *villenage*, the latter being usually three-fifths or two-thirds of the whole. The demesne consisted partly of separate closes, partly of acres scattered among those of the tenants in the common fields; and we may, later, see reason to believe that originally the lord's portion had consisted entirely of such scattered acres, with possibly a rather larger farmyard around his house than

[1] Adapted from *An Introduction to English Economic History and Theory*, pp. 5–32. (Copyright by Longmans, Green, & Co., London. Used by permission of the publisher.)

those of the rest of the villagers. Of the land held in villenage, far the greater part was held in *whole* or *half virgates* or *yardlands*. The virgate was a holding made up of scattered acre or half-acre strips in the three fields, with appurtenant and proportionate rights to meadow and pasture; and its extent, there can be no doubt, was usually thirty acres, although in some manors it was as few as sixteen, in others as many as forty-eight. The holders of such virgates or half-virgates formed a class socially equal among themselves, and all of them, in any particular manor, with the same obligations of service to the lord. They were known as *villani*, i.e., the "villagers" *par excellence*, and in the thirteenth century as *virgarii*, in English *yardlings*, while in the north they often bore the title *husbands*. Below these was the class of *bordars* and *cotters*, most of them holding only a cottage and one or two acres, though sometimes as many as five, eight, or ten acres—of course in the common fields. They seem to have been marked off from the *villeins* proper by not possessing oxen or plough; and probably in many cases they were employed by the *villeins*.

The whole of the land of the manor, both demesne and villenage, was cultivated on an elaborate system of joint labour. The only permanent labourers upon the demesne itself were a few slaves; all or almost all the labour there necessary was furnished by the villeins and cotters, as the condition on which they held their holdings, and under the supervision of the lord's bailiff. At first sight bewildering in their complexity, the duties may readily be distinguished as falling under two main heads: (1) a man's labour for two or three days a week throughout the year, known as *week-work* or *daily works;* and (2) additional labour for a few days at spring and autumn ploughing and at harvest time. On such occasions the lord frequently demanded the labour of the whole family, with the exception of the housewife. For these additional services the commonest English expressions were *boon-days*, *loveboons*, and *bedrips* (*reaping* specially *bidden*). Besides these, there were usually small quarterly payments to be made in money, and miscellaneous dues in kind, differing from manor to manor —so many hens and eggs, or so many bushels of oats at various seasons; as well as miscellaneous services, also differing in the different manors, of which the one most frequently mentioned is "carting." During the boon-days it was usual for the lord to feed the labourers; and, in the later custumals, the precise definition of the days upon which they were and were not to be fed at the lord's expense, or, even more minutely, when they were to have drink and nothing else, when

bread and no drink—a "*dry* repast"—when black bread, when white, when even meat, broth, and cheese, often enlivens the dull record with a gleam of humour. In one place, indeed, we are told that on the last two days of harvesting each labourer could bring a comrade to supper.

Of the other side of village life—the labour of the tenants upon their own virgates—we have no knowledge; we can only conjecture that it also was carried on by a system of joint labour, each holder contributing oxen and men to the common ploughs, in proportion to his holding, probably also joining his fellows in mowing hay and reaping corn on some common plan.

When we compare the comparative simplicity of *Domesday Book*, in which, over the greater part of England, villeins, cotters or borders, and slaves make up the whole of the population, with the elaborate division into six, eight, or even ten classes in the custumals of the latter part of the thirteenth century, the changes seem bewildering in their complexity and variety. But it will be found that most of them may be grouped under four heads: (1) the growth of a large class of free tenants; (2) the commutation of the week-work for pecuniary payments; (3) the commutation of the boon-days and other special services; and (4) the appearance of a class of men dependent wholly or in part on the wages they received for agricultural labour.

1. The rapid increase in the number of free tenants after the Conquest is one of the most certain and important of facts. The larger number of those known by the name *libre tenentes* were, clearly, virgate-holding villeins or the descendants of such, who had commuted their more onerous labour services of two or three days a week for a fixed sum of money, and had been freed from what were regarded as the more servile "incidents" of their position. In some manors it was possible for the number of freeholdings to be raised by an increase in the extent of cultivated land. Near most of the villages was a stretch of "waste" land, covered with trees and bushes and used for common pasturage. As the increase of population strengthened the labour forces of the manor, it became the lord's interest to enclose portions of the waste, and either add them to his demesne or let them to the villagers. The grants seem almost invariably to have been small; cases in which they are as large as ten or twelve acres are very rare, and usually they are only five, four, three, or two acres, very frequently one acre or even one *rood;* and they were always let at

money rents, and never subject to labour obligations. Among the names of the tenants of the *essart*, or clearance, we find many who held at the same time either virgates in free tenure or land in villenage; but probably in most cases the new holdings were given to the younger sons of tenants—especially cotters—who otherwise would have held no land at all. It was here, and on the demesne, that cottages and plots of land were found for the artisans, mostly *weavers*, who first show themselves in the thirteenth century.

Hitherto all the freeholdings described were such as were created on the land held in villenage, or on land which the villeins had previously held in common. Allusion, however, has already been made to tenants holding demesne land. The letting of portions of the demesne for money rents had in many instances taken place quite as early as any of the other changes which have been described. It has been seen that the whole organization of the manor was directed toward providing labour for the cultivation of that part which the lord kept in his own hands. It is therefore evident that if the lord found it to his interest to let portions of the demesne instead of cultivating it through his bailiff or reeve, his need for the services of the villeins would be *pro tanto* diminished, and he would be the readier to accept commutation. The letting of the demesne would do more, then, than any other thing to change the relations between the lord and the villagers. But if, as may be naturally supposed, the renting of demesne land often meant only that a man who had previously been bound to cultivate certain acres, the lord taking the produce, now promised a certain fixed amount in return for whatever the produce might chance to be, there would be absolutely no disturbance at all in the actual method of cultivation.

2. In all the cases previously noticed the commutation of labour-dues for money had been accompanied by a rise from servile to free tenure. But from the beginning of the thirteenth century we notice a much more general and far-reaching change, the commutation of week-work, or even of all labour services, without the tenant being thereby raised to a free tenure. We find in many of the custumals of the thirteenth century that, even where the labour is not generally commuted, each item of it—a day's work of each sort—is precisely valued, at a halfpenny, a penny, or the like. At first, probably, this was in order to assess the fines to be paid by a villein who neglected his due task. But very often the money would be more welcome than the labour; and in *Fleta* the reeve is directed to look carefully

after arrears of labour, and to try to get money for them. This would naturally lead to the total money value of all the services being added up, and to commutation being effected by the more prosperous and ambitious villeins. Yet the lords were not equally indifferent with regard to all services, as to whether they received money or labour. The extra labourers needed at the busy seasons could not so easily be obtained for hire; and consequently we find that in most cases the lords retain the precariae and exceptional services long after the week-work has disappeared. Commutation was carried on very gradually over the country. In the middle of the thirteenth century it does not seem to have been effected in any case on the estates of Ramsey Abbey; nor was it, apparently, often the practice on the estates of Gloucester Abbey twenty years later, or of Battle Abbey even at the end of the century, though the value of the services is given in money.

3. The more prosperous the free tenants and customary tenants became, the more eager they would be to get rid of the obligation of furnishing labour, even if only at certain seasons. This would be especially irksome for the smaller customary tenants and cotters, who might in many cases have to leave their own acres at the time when they were most anxious to attend to them. There would be a tendency, therefore, for all services to be commuted for money payments, with which the bailiff could hire labourers more easily controlled.

4. Now it is evident that the lord would not have consented, first to partial and then to complete commutation, had he not been able to hire labourers either for regular service during the whole or part of the year, or at specially busy seasons. These changes, then, imply that a class of *labourers* had come into existence; a class of men, that is to say, who, although they undoubtedly often had pieces of land—even two or three acres—yet had not enough land to occupy their whole attention, and were partially dependent upon wages. But this body of labourers must as yet have been comparatively small. There are several lists extant of the permanent servants on a manor. They seem to have been few in number—a reaper, two or three ploughmen, a carter, a woodward or swineherd, one or two shepherds, one or two oxherds or cowherds, and a dairywoman. Some of these, such as the shepherds and oxherds, were probably descended from the slaves of the demesne; while the *mesor*, or reaper, seems to have been an officer little inferior to the reeve. It does not appear that commutation had the effect of greatly increasing the number of permanent hired servants on the demesne.

10. THE SELF-SUFFICING CHARACTER OF THE MANOR[1]

By W. J. ASHLEY and R. E. PROTHERO

In the Middle Ages agriculture was a self-supporting industry rather than a profit-making business. The fundamental character of the manorial group, regarded from the economic point of view, was its *self-sufficiency*, its *social independence*. Few of the necessaries of life were ever bought by the cultivators of the soil, and whether the corn that they raised was fetching 3*s*. or 6*s*. in a distant market made little difference to the inhabitants of the villages. They grew it for their own consumption. Owing to difficulties of communication, every village raised its own bread-supply. Hence a great extent of land, which from a farming point of view formed an excessive proportion of the total area, was tilled for corn, however unsuited it might be for arable cultivation. As facilities of transport increased, this necessity became less and less paramount. Land best adapted to pasture no longer required to be ploughed, but might be put to the use for which it was naturally fitted. Improvements in means of communication were thus among the changes which helped to extinguish village farms. But for the time, and so long as the open-field system prevailed, farming continued to be in the main a self-sufficing industry. Except for the payment of rent, little coin was needed or used in rural districts. Parishes till the middle of the eighteenth century remained what they were in the thirteenth century—isolated and self-supporting. The inhabitants had little need of communication even with their neighbours, still less with the outside world. The fields and the live stock provided their necessary food and clothing. Whatever wood was required for building, fencing, and fuel was supplied from the wastes.

Each village had its mill, and nearly every house had its oven and brewing kettle. Women spun and wove wool into coarse cloth and hemp or nettles into linen; men tanned their own leather. The rough tools required for cultivation of the soil and the rude household utensils needed for the comforts of daily life were made at home. In the long winter evenings, farmers, their sons, and their servants carved the wooden spoons, the platters, and the beechen bowls. They fitted and riveted the bottoms to the horn mugs, or closed, in coarse fashion, the leaks in the leathern jugs. They plaited the osiers and

[1] Adapted from *An Introduction to English Ecouomic History and Theory*, I, 35–48, and *English Farming, Past and Present*, pp. 28–31 (Copyright by Longmans, Green, & Co., London. Used by permission of the publisher.)

reeds into baskets and "weeles" for catching fish. They fixed handles to the scythes, rakes, and other tools; cut the flails from holly or thorn, and fastened them with thongs to the staves; shaped the teeth for rakes and harrows from ash or willow, and hardened them in the fire; cut out the wooden shovels for casting the corn in the granary; fashioned ox yokes and bows, forks, racks, and rack-staves; twisted willows into scythe-cradles, or into traces and other harness gear. The village "general shop" had not yet come into existence; in many places it did not appear until the present century, partly because many of the wants which it meets were not yet felt, partly because such wants as were felt were supplied either by journeys at long intervals to some distant fair or market, or by the labour of the family itself.

Thus the inhabitants of an average English village went on—year in, year out—with the same customary methods of cultivation, living on what they produced, and scarcely coming in contact with the outside world. The immediate neighbourhood of large towns created markets for the surplus produce that remained after satisfying the needs of the cultivators of the soil. But remoter villages contained neither buyers of produce nor pioneers of improvements. The very existence of *towns*, indeed, implied that the purely agricultural districts produced more than they required for their own consumption; and corn and cattle were regularly sent, even to distant markets, by lords of manors and their bailiffs, in increasing quantities as the great lords or corporations came to desire money payments instead of payments in kind. But the other dealings of the villagers with the outside world were few.

It may be well to notice the non-existence in the village group of certain elements which modern abstract economics is apt to take for granted. *Individual liberty*, in the sense in which we understand it, did not exist; consequently, there could be no such complete *competition* as we are wont to postulate. The payments made by the villeins are not *rents* in the abstract economist's sense: for the economist assumes competition—assumes that landlord and farmer are guided only by commercial principles; that there is an average rate of profit, which the farmer knows; that he will not take less and cannot get more. However the labour services came to be fixed, they were fixed in the eleventh century; they remained unchanged till they were commuted for money; and, once commuted, no increase took place in the money rent. The chief thought of lord and tenant was,

not what the tenant could possibly afford, but what was customary. And, finally, there was as yet no *capital* in the modern sense. Of course there was capital in the sense in which the word is *defined* by the orthodox economists—"wealth appropriated to reproductive employment"; for the villeins had ploughs, harrows, oxen, horses. But this is one of the most unreal of economic definitions. As has been well said, "by capital we habitually mean more than this; we mean a store of wealth which can be directed into new and more profitable channels as occasion arises. In this sense the villeins certainly had no capital, and it was only gradually, as commutation began, that the landlord was getting to have something that he could "capitalize," i.e., that he could save with the intention of getting a profit from it by and by.

Little as the mere substitution of money payments for labour-dues may seem to have affected the relations of classes, it marked the beginning of a change of supreme importance. The German economist Hildebrand was the first to point out that whatever difference there may have been between the economic development of the different European nations, there is one characteristic common to all, the transition, namely, from *payment in kind* to *payment in money*. Such a way of phrasing it, indeed, but very inadequately represents what Hildebrand meant by the transition from *Naturalwirthschaft* to *Geldwirthschaft*—the development of a society in which exchange, and the distribution of wealth generally, are effected by means of, or expressed in terms of, a metallic currency, from one in which land was given for service, service given for land, goods exchanged for goods, without the intervention of a currency at all. This change is what we see in all directions during these three centuries.

In examining the character of the village group, we saw that in the eleventh century, and in most cases long afterward, the lord and his family lived upon the produce of his demesne, cultivated by the customary labour services of his tenants, and the tenants upon the produce of the lands which they held in return for such services; and we have noticed how very gradually these services were exchanged for money, so that the lord should receive a rent with which he might hire wage-labourers. What is true of the several manorial groups was true also of the relations between the tenants and the seigneurial household in those cases where a lord held a great number of manors. The lords received from their bailiffs, not sums of money, but certain amounts of agricultural produce, for the maintenance of their

households. Markets where men might be confident of obtaining money for their wares, or of obtaining wares for their money, were scarcely known.[1]

E. The Agrarian Revolution

11. THE DECLINE OF FEUDALISM AND THE IMPROVEMENT OF AGRICULTURE[2]

By ROWLAND E. PROTHERO

Under the condition which prevailed in the fourteenth and fifteenth centuries, little advance in farming practices could be expected. Few of the baronial aristocracy verified the truth of the maxim that "the master's foot fats the soil." The strenuous idleness or the military ardours of youthful lords were generally absorbed in field sports and martial exercises: most of the lay barons rebelled against the minute and continuous labour of farming.

There was little to mitigate either for men or beasts the horrors of winter scarcity. On land which was inadequately manured, and on which neither field-turnips nor clovers were known till centuries later, there could be no middle course between the exhaustion of continuous cropping and the rest-cure of barrenness. As with the land, so with its products. Famine trod hard upon the heels of feasting. Both for men and beasts the absolute scarcity of winter always succeeded the relative plenty of autumn.

But with the decay of feudalism land came to be regarded as a source of income, not of military power. As landowning became a business and farming a trade, agricultural progress demanded less personal dependence, a freer hand, a larger scope of individual enterprise.

With the dawn of the Tudor period began the general movement which gradually transformed England into a mercantile country. On

[1] A recent writer (Gras, *Evolution of the English Corn Market*) has taken a somewhat different view of the economic position of the manor. He is interested in tracing even the most remote beginnings of market relations, and finds that such contacts were established at an earlier period in the history of the manor than has been generally supposed. But even if we concede that the isolation of the manor has been overemphasized in some degree by Prothero and Ashley, it still remains true that its activities were but slightly commercialized as measured by modern standards.—EDITOR.

[2] Adapted from *English Farming, Past and Present*, pp. 32–35, 55–57. (Copyright by Longmans, Green, & Co., London. Used by permission of the publisher.)

the agricultural side, the spirit of trading competition gave fresh impulse to an old movement, which, in spite of a storm of protest, continued in activity through the Tudor period, and, after a century and a half of silent progress, became once more the center of literary controversy before it triumphed at the close of the reign of George III.

That movement is described as enclosure. The word includes various processes, but that special form of enclosure was prominent which meant the break-up of the mediaeval agrarian partnerships and the substitution of private enterprise for the collective efforts of village associations. Agriculturally the period is one of transition toward the modern spirit and form of land cultivation.

12. ENCLOSURE AND BETTER FARMING[1]

By ARNOLD TOYNBEE

There is no respect in which the agricultural England of today differs more from that of the period which we are considering than in the greatly reduced amount of common land. The enclosure of commons had been going on for centuries before 1760, but with nothing like the rapidity with which it has been going on since. It is known that 334,974 acres were enclosed between 1710 and 1760, while nearly 7,000,000 were enclosed between 1760 and 1843. At the beginning of the latter period a large proportion of this land, since enclosed, was under the primitive tillage of the common fields. Throughout considerable districts the agrarian system of the Middle Ages still existed in full force. Some parishes had no common or waste lands belonging to them, but where common lands were cultivated one and the same plan was generally pursued. The arable land of each village was divided into three great strips subdivided by "baulks" three yards wide. Every farmer would own at least one piece of land in each field, and all were bound to follow the customary tillage. One strip was left fallow every year; on the other two were grown wheat and barley; sometimes oats, pease, or tares were substituted for the latter. The meadows were also held in common. Up to hay-harvest, indeed, every man had his own plot, but, while in the arable land the plots rarely changed hands, in the meadows the different shares were apportioned by lot every year. After hay-harvest the fences in the meadow land were thrown down, and all householders had common rights of grazing on it. Similarly the stubbles were grazed, but here

[1] Adapted from *The Industrial Revolution*, pp. 38–46.

the right was rarely open to all. Every farmer had the right of pasture on the waste.

Though these common fields contained the best soil in the kingdom, they exhibited the most wretched cultivation. "Never," says Arthur Young, "were more miserable crops seen than all the spring ones in the common fields; absolutely beneath contempt." The causes of this deficient tillage were three in number: (1) The same course of crops was necessary. No proper rotation was feasible, the only possible alteration being to vary the proportion of different white-straw crops. There were no turnips or artificial grasses, and consequently no sheep-farming on a large scale. Such sheep as there were, were miserably small; the whole carcase weighed only 28 lbs. and the fleece $3\frac{1}{2}$ lbs. each, as against 9 lbs. on sheep in enclosed fields. (2) Much time was lost by labourers and cattle "in travelling to many dispersed pieces of land from one end of a parish to another." (3) Perpetual quarrels arose about rights of pasture in the meadows and stubbles and respecting boundaries; in some fields there were no "baulks" to divide the plots, and men would plough by night to steal a furrow from their neighbours.

For these reasons the connection between enclosure and improved agriculture was very close. The early enclosures, made under the Statutes of Merton (1235) and Westminster (1285), were taken by the lords of the manor from the waste. But in these cases the lord had first to prove that sufficient pasturage had been left for the commoners; and if rights of common existed independent of the possession of land, no enclosure was permitted. These early enclosures went on steadily, but the enclosures which first attract notice toward the end of the fifteenth century were of a different kind. They were often made on cultivated land, and, if Nasse is correct, they took the form, not only of permanent conversions from arable into pasture, but of temporary conversions from arable into pasture, followed by reconversion from pasture into arable. The result was a great increase of produce. The lord having separated his plots from those of his neighbours, and having consolidated them, could pursue any system of tillage which seemed good to him. The alternate and convertible husbandry mentioned above was introduced; the manure of the cattle enriched the arable land, and "the grass crops on the land ploughed up and manured were much stronger and of a better quality than those on the constant pasture." Under the old system the

manure was spread on the common pasture, while in the enclosures it was used for the benefit of land broken up for tillage.

But the greatest progress in the first half of the eighteenth century seems to have taken place in Norfolk. Everyone has heard of Townshend growing turnips at Raynham, after his quarrel with Walpole; and Young, writing in 1812, after speaking of the period 1700–1760 as one of stagnation, owing to low prices ("it is absolutely vain to expect improvements in agriculture unless prices are more disposed to rise than to remain long without variations that give encouragement to the farmer"), admits that the improvements made in Norfolk that time were an exception. In his *Eastern Tour* (1770) he had spoken of the husbandry "that has rendered the name of this country so famous in the farming world," and given seven reasons for the improvements. These were: (1) enclosing without assistance of Parliament; parliamentary enclosure, "through the knavery of commissioners and attorneys," was very expensive; "undoubtedly many of the finest loams on the richest marls would at this day have been sheep-walks, had there been any right of commonage on them"; (2) marling, for there was plenty of marl under the sand everywhere; (3) an excellent rotation of crops—the famous Norfolk four years' course of turnips, barley, clover (or clover and rye-grass), and wheat; (4) the culture of turnips well hand-hoed; (5) the culture of clover and rye-grass; (6) the granting of long leases; (7) the division of the county chiefly into large farms. "Great farms," he says, "have been the soul of the Norfolk culture," though in the eastern part of the county there were little occupiers of £100 a year.

If we turn from the cultivation of the soil to the management and breeding of live stock, we shall find that no great progress had been made in this branch during the years 1700–1760. Davenant in 1700 estimated the net carcase of black cattle at 370 lbs., and of a sheep at 28 lbs. A century later Eden calculated that "bullocks now killed in London weigh at an average 800 lbs., sheep 80 lbs., and lambs about 50 lbs. each"; and Young in 1786 put the weight of bullocks and sheep at 840 lbs. and 100 lbs. respectively. But this improvement seems to have come about after 1760. It was not until 1760–1786 that Bakewell perfected the new breed of sheep—the Leicesters—and improved the breed of long-horned cattle, and that the brothers Culley obtained the short-horn, or Durham cattle, from the breed in the valley of the Tees. Some improvement in the breed of sheep had,

however, already been made. "The wool of Warwickshire, Northamptonshire, Lincolnshire, and Rutland, with some parts of Huntingdon, Bedford, Buckinghamshire, Cambridgeshire, and Norfolk, has been accounted the longest and finest combing wool. But of late years [this was written in 1739] there have been improvements made in the breed of sheep by changing of rams and sowing of turnips and grass seeds, and now there is some large fine combing wool to be found in most counties in England, which is fine, long, and soft, fit to make all sorts of fine stuff and hose of." Still improvements in feeding sheep were by no means universally adopted for half a century later. Agricultural implements, too, were very primitive, wooden ploughs being commonly in use, while the small, narrow-wheeled waggon of the North held 40 or 50 bushels with difficulty.

An agrarian revolution plays as large part in the great industrial change of the end of the eighteenth century as does the revolution in manufacturing industries, to which attention is more usually directed. Severely as these changes bore upon the rural population, they wrought, without doubt, direct improvement from an agricultural point of view. They meant the substitution of scientific for unscientific culture. "It has been found," says Laurence, "by long experience, that common or open fields are great hindrances to the public good, and to the honest improvement which everyone might make of his own." Enclosures brought an extension of arable cultivation and the tillage of inferior soils; and in small farms of 40 to 100 acres, where the land was exhausted by repeated corn crops, the farm buildings of clay and mud walls and three-fourths of the estate often saturated with water, consolidation into farms of 100 to 500 acres meant rotation of crops, leases of nineteen years, and good farm buildings. The period was one of great agricultural advance; the breed of cattle was improved, rotation of crops was generally introduced, the steam-plough was invented, agricultural societies were instituted.

F. America Recapitulating the History of Agriculture

13. COLONIAL FARMING[1]

By BENJAMIN PERLEY POORE

The North American aborigines were not an agricultural people; the cultivation of the soil was considered among them as a degrading occupation for the men of the tribes, who left it to the old women and

[1] Adapted from "History of the Agriculture of the United States," *Report of the Commissioner of Agriculture for the Year 1866*, pp. 498–509.

children. Captain John Smith, who visited Virginia in 1609, says: "The greatest labor they take is in planting their corn, for the country is naturally overgrown with wood. To prepare the ground they bruise the bark of trees near the roots, then do they scorch the roots with fire that they grow no more." This custom of theirs, it probably was, that suggested to our ancestors the process of belting or girdling, which killed the larger trees by cutting through the sap-wood, caused the fall of spray and lesser branches, and thereby admitted the sun and air to the crop cultivated in their intervals—a practice which, as compared with the method of clearing off the entire growth, enables the settler of new lands to increase the area of virgin soil under culture in more than geometrical ratio; which has kept pace with our ever advancing frontier, and which, more than any other, has enabled the white race "to enter in and possess the good land that lay before them."

The land being cleared—and a field once thus prepared was used for many successive years—the squaws would make preparations for planting early each spring. First burning the dead wood on the ground, and often bringing dry branches to burn, that they might obtain their fertilizing ashes, they would then cultivate, or rather root up the surface, with the flat shoulder-blades of the moose or with crooked pieces of wood. They would then mark the future hills by making small holes (about four feet apart) with rude wooden hoes or clam shells; put into each one an alewife from some adjoining stream, or a horseshoe crab from the seashore; and on this stimulant drop and cover a half dozen grains of corn. The land thus planted was guarded against the depredations of the birds, and as the corn grew the earth was laboriously scraped up around the stalks with clam shells, until the hills were two feet high. To use the words of Smith, "they hill it like a hop field." While the stalk and leaves were yet green, the ears were plucked. The next year's seed was selected from those stalks which produced the most ears, and was triced up in their wigwams. The remainder of the crop was carried in back-baskets to stagings, where it was dried in the husk over smouldering fires, then husked, shelled, packed in large birchbark boxes, and buried in the ground, below the action of the frost. "With their corn," says Smith, "they plant also peas they call assentamus, which are the same they call in Italy fagiolia. Their beans they much esteem for dainties." "In May, also, among their corn they plant pumpeons, and a fruit like unto a musk-melon, but less and worse." These additional crops not only keep the ground around the roots of the growing

corn moist, but they supply materials for the celebrated Indian dish called "mu-si-quatush," which has been changed into sucatush. At the northwest wild rice was gathered and kept for winter use; and Barlowe, who visited North Carolina in 1584, asserted that he saw there "both wheat and oats." It is not improbable that oats were found growing wild there, as they are known to grow wild on other portions of the continent; but doubts may be entertained as to the wheat. Possibly he saw some variety of the triticum, and, without critical examination, pronounced it wheat. The sunflower was also cultivated for its seeds, of which bread was made.

"Mish-i-min," in the Algonquin tongue, signifies apple, although it is the opinion of some learned writers that this fruit was unknown among them before the arrival of the Europeans. Several old printed compilations of early voyages, however, reckon apples among the early native fruits; and Mr. Walcott, a distinguished Connecticut magistrate, wrote in 1635 (certainly not more than five years after his colony was first planted), "I made five hundred hogsheads of cider out of my own orchard in one year." This would have been almost impossible had he been obliged to raise his orchard from the seed, or had he planted trees of such a size as could have been transported through the trackless wilderness. Certainly the Indians had orchards of cherries and of plums, large stores of which were dried for winter use. Tobacco was everywhere cultivated, huge grapevines entwined many a forest tree, and there was an abundance of berries in the woods. Gourds were raised in great numbers. From the sap of the maple was made a coarse-grained sugar.

Such was the primitive agricultural life of the Indians. On many a sunny slope now smiling with cultivation were their cheerless wigwams, their crabbed orchards, their ill-tilled corn patches.

The English Puritans who settled in New England "left their pleasant and beautiful homes in England to plant their poor cottages in the wilderness," that they might worship God as revelation and conscience might teach, and found a free agricultural state equal to Palestine in its palmiest days, when Israel's kings had "herds of cattle, both in the low country and on the plains, granaries for their abundant crops, husbandmen also, and vine-dressers in the mountains."

In England, agriculture has long been regarded as the most favorable occupation for the development of Christianity, and had, prior to the Reformation, received the special attention of the clergy.

Dorsetshire and Wiltshire, the English homes of the Puritans ere they made their exodus to a transatlantic Canaan, are even now remarkable for their almost total absence of the usual signs of trade and manufactures; and we are informed by Bancroft that those who first went to Holland were anxious to emigrate again because they "had been bred to agricultural pursuits," yet were there "compelled to learn mechanical trades."

This desire on the part of the Puritans that "New England" should be an agricultural community was strikingly manifested by the corporation of Massachusetts Bay, whose charter extended from a line three miles south of Charles River to another three miles north of "any and every part" of the Merrimac. Each contributor and each stockholder received two hundred acres of land for every fifty pounds sterling paid in, while stockholders and others who emigrated at their own expense received fifty acres for each member of their family and each "indented servant." This shows that it was a rural home in this land of freedom, and not town lots or semiannual dividends that these liberal adventurers sought, and we find further confirmation of their agricultural proclivities in the inventories of the supplies sent by the corporation to the new colony. "Vyne planters" are mentioned usually after "ministers"; then come hogsheads of wheat, rye, barley, and oats, unthreshed; beans, peas, and potatoes; stones of all kinds of fruit; apple, pear, and quince kernels; hop, licorice, and madder roots; flax and woad seed; currant plants, and tame turkeys. Cattle were imported by the colonists, not only from various parts of England, but from Holland, Denmark, and the Spanish Main, forming a noble foundation for that "native stock" which, when carefully reared and well fed, is at least equal to many of the vaunted imported breeds. Horses, sheep, swine, and goats were also imported from Europe in large numbers. Neither was horticulture neglected, for we find that Governor Endicott had a vegetable garden and vineyard in 1629, and two years afterward he planted the famous pear orchard of which one venerable survivor still bears the patriarchal honors.

The immigrants found that Boston had "sweet and pleasant springs and good land affording rich corn grounds and fruitful gardens"; but as their numbers and the numbers of their cattle increased, they formed colonies in various directions, especially in "Wanne-squam-sauke" (now Essex County), for amid its "pleasant waters" were unwooded meadows suitable for pasturage and for grass cutting,

while the uplands were well adapted for tillage. Squatter sovereignty was unknown, for no individuals were permitted to establish themselves within the limits of the colony. Each body swarmed out in community, with a regular allotment of individual farms, based in extent upon the wealth of the settlers, and a great pasture, a peat meadow, a salt marsh, and fishing grounds held in common. These farms were so laid out that no house was over half a mile from the meeting-house, and it was with astonishing rapidity that agricultural communities sprang up like the fabled warriors of Cadmus into full-armed life.

The immigrants were supplied with carts, chains, shovels, hoes, and rakes, but it was some years before a plough was introduced; and even so late as 1637 there were but thirty ploughs in Massachusetts. A yeoman in Salem that year made complaint that "he had not sufficient ground to maintain a plough" on his tract of three hundred acres, and he was allowed an addition of twenty acres to his original grant if he would "set up ploughing." The ploughs first used were the imported English wheel ploughs, but somewhat lighter, although clumsy kinds were in time made by the village wheelwright and blacksmith. Then came what was long known as the Cary plough, with clumsy wrought-iron share, wooden landside and standard, and wooden mouldboard plated over with sheet-iron or tin, and with short, upright handles, requiring a strong man to guide it. The bar-share plough was another form still remembered by many for its rudely fitted wooden mouldboard and coulter, and immense friction from the rough iron bar which formed the landside.

Massachusetts was the first among the colonies to introduce the manufacture of scythes and other agricultural implements. In 1646 the general court granted to Joseph Jenckes, of Lynn, a native of Hammersmith, in England, and connected with the first ironworks in that colony, the exclusive privilege for fourteen years "to make experience of his abillityes and inventions for making, among other things, of mills for the making of sithes and other edge tooles." His patent "for ye more speedy cutting of grass" was renewed for seven years in May, 1655. The improvement consisted in making the blade longer and thinner, and in strengthening it at the same time by welding a square bar of iron to the back, as in the modern scythe, thus materially improving upon the old English scythe then in use, which was short, thick, and heavy, like a bush scythe. A century later a Scotchman named Hugh Orr came to Massachusetts and erected at Bridge-

water the first trip hammer in the colony, with which he manufactured scythes, shovels, axes, hoes, and other implements, for which that place has since enjoyed a deserved reputation.

The tidewater regions of Maryland and Virginia and the Carolinas were originally settled by the cavalier aristocracy of England, with their servants and their slaves. Next came the Scotch merchants and mechanics, and French Huguenots of high character and attainments. In later years, the unsuccessful rebellions of the elder and younger Pretenders forced large numbers of Scotch Jacobins to seek new homes on the western continent. Many indentured white servants, and some transported convicts, were also sent over from England.

The feudal system was transplanted to Virginia, and the royal grants of land gave the proprietors baronial power. The Maryland and Virginia estates were large, extending far back in the country from their fronts on the Chesapeake Bay or its tributaries, near which the buildings were located. Tidewater was at every cavalier planter's door, and ships from England brought him his annual supplies of merchandise in exchange for his crop of tobacco, while smaller crafts came with the products of the New England fisheries and of the West India plantations to barter for his tobacco, cotton, wheat, or corn. The neighboring waters swarmed with many varieties of wild fowl, and abounded with fish, oysters, soft crabs, and turtle, while in the woods was an abundance of game.

Tobacco became the staple product of Virginia soon after the first settlement of the British colonists, and although many and stringent laws were enacted to prevent its cultivation, little attention was paid to any other crops beyond what was needed for home consumption. Attempts were made to encourage other branches of rural industry. But the Virginia landowners preferred the exhausting tobacco plants, with a continuous cropping, shallow ploughing, and no supplies of fertilizers, until every particle of nourishment had been drawn from the soil by the plants, or washed out by the rains. The implements used were small ploughs and heavy hoes; and when the tobacco had been gathered, cured, and packed into hogsheads, these were rolled to the nearest inspection wharf. The roads were bad, and there were but few wagons, so a pole and whiffletrees were attached to each hogshead by an iron bolt driven in the centre of each head, and it was converted into a large roller. For many years the places for deposit and inspection of tobacco on the river were called "rolling houses."

King James the First, prompted doubtless by his antipathy to "the Virginia weed," and "having understood that the soil naturally yieldeth store of excellent mulberries," gave instructions to the Earl of Southampton to urge the cultivation of silk in the colony in preference to tobacco, "which brings with it many disorders and inconveniences." "As early as the year 1623, the colonial assembly directed the planting of mulberry trees; and in 1656 a penalty of ten pounds of tobacco is imposed upon every planter who shall fail to plant at least ten mulberry trees for every hundred acres of land in his possession. In the same year a premium of 4,000 pounds of tobacco was given to a person as an inducement to remain in the country and prosecute the trade in silk; and in the next year a premium of 10,000 pounds of tobacco was offered to any one who should export 200 pounds worth of the raw material of silk." About the same time 5,000 pounds of the same article was promised "to any one who should produce 1,000 pounds of wound silk in one year." In 1666 it was determined that all statutory provisions were thereafter unnecessary, as the success of divers persons in the growth of silk, and other manufactures, "evidently demonstrated how beneficial the same would prove."

Cotton, which is the staple of the southern states settled by Virginians, was first grown by the early colonists in 1621, but it was not an article of general home consumption or of export for many years. In 1748 seven bags of cotton-wool, valued at £3 11*s.* 5*d.* a bag, were among the exports of Charleston, South Carolina; and after the Revolution the growth and exportation of the sea island cotton was commenced, seed having been obtained from one of the leeward isles. Originally the cotton was separated from the seed with the fingers, and afterward there were several contrivances used, among them the employment of a long bow fitted with a number of strings, which being vibrated by the blows of a wooden mallet while in contact with a bunch of cotton, shook the seed and dust from the mass. In 1742, M. Dubreuil, a wealthy planter of New Orleans, invented a cleaning-machine, which was so far successful as to give quite an impulse to the cotton culture in Louisiana, and several other inventions were subsequently used in other sections of the South, but none of them accomplished the desired work. In 1794, Eli Whitney, a native of Massachusetts, then residing in Georgia, discovered the saw-gin, which completely removes all extraneous matters without injury to the fibre, and enables a man to clean three hundred pounds a day

instead of one pound, as he had been able to do by hand. This wonderful labor-saving machine has exerted an influence on the industrial interests of the world, and has placed cotton foremost among our national exports.

The production of wine in the Atlantic colonies was believed to be practicable by many of the early settlers, and several of the governors endeavored to encourage the planting of vineyards. In 1758, the London Society for the Encouragement of Arts, Commerce, and Manufactures proposed the following premium for the wine itself: "As producing wines in our American colonies will be of great advantage to those colonies, and also to this kingdom, it is proposed to give to that planter, in any of our said colonies, who shall first produce, within seven years from the date hereof, from his own plantation, five tons of white or red wine, made of grapes, the produce of these colonies only, and such as, in the opinion of competent judges, appointed by the society in London, shall be deemed deserving the reward—not less than one ton thereof to be imported to London—one hundred pounds."

14. THE SELF-SUFFICING AGRICULTURE OF A GENERATION AGO[1]

By RODNEY WELCH

During my childhood, which was passed on a rocky hillside farm in New England, farmers constituted a class more nearly independent than any other in the community. They were engaged in domestic husbandry, which embraced the care of cultivated fields, pastures, gardens, orchards, and forests. They produced nearly all the food that was necessary for their families. The owner of a small farm not infrequently raised corn, wheat, rye, barley, and buckwheat, as well as potatoes and all kinds of garden vegetables. The sweets for the table were often limited to the sugar and molasses that he made from the sap of the maple and to the honey collected by his bees. Small game was obtained from the forest, and trout were caught in the streams that flowed among the hills. The lakes afforded larger fish, like perch and pickerel. Every farmer's intention was to raise each needful article of food that the climate and soil enabled him to produce. Even condiments, like pepper, caraway seed, sage, and other

[1] Adapted from "The Farmer's Changed Condition," *Forum*, X (February, 1891), 689–92.

sweet herbs, were not below his attention. As a considerable portion of every farm was covered with forest trees of various kinds, the owner was at no expense for fuel or for materials to be used in making fences or in erecting ordinary buildings.

In those times most of the trade of farmers was carried on by barter. Eggs, butter, cheese, and smoked hams were taken by country storekeepers in exchange for groceries, dry goods, and notions. Nearly every farmer went to the seashore once a year, and exchanged apples, cider, potatoes, and garden vegetables for fish. The products of farm, garden, and orchard often paid the salary of the minister, the fees of the doctor, and the subscription price of the newspaper. A thrifty farmer generally managed to have the skins of the animals that he slaughtered at home tanned and dressed on shares, as by so doing he obtained leather for making shoes and boots for his family without the payment of money. Shoemakers, tailoresses, wheelrights, and pump-makers plied their arts on farms at the call of the owners.

Every farmhouse was then a manufactory, not of one kind of goods, but of many. All day long in the chamber or att c the sound of the spinning-wheel and loom could be heard. Carpets, shawls, bedspreads, table-covers, towels, and cloth for garments were made from materials produced on the farm. The kitchen of the house was a baker's shop, a confectioner's establishment, and a chemist's laboratory. Every kind of food for immediate use was prepared there daily; and on special occasions sausages, head cheese, pickles, apple butter, and preserves were made. It was also the place where soap, candles, and vinegar were manufactured. Agricultural implements were then few and simple, and farmers made as many of them as they could. There were no commercial dairy establishments, but every farmhouse was a creamery and a cheese factory. As there were no sewing machines, the farmer's wife and daughters had to ply the hand needle most of the time when they were not engaged in more laborious pursuits. During the long evenings they generally knit socks and mittens or made rag carpets.

As has been stated, little money circulated among farmers. In fact, but little was required, except to purchase schoolbooks and other articles that could not be obtained by barter, and to pay the taxes and postage. Some of the taxes, even, were not paid in money. The highway tax was generally paid in labor, or rather in play. In many cases farmers had their postage charged up to them till they

could raise money to pay it. Most of the pastoral scenes described by the writers of the Old Testament, and by Virgil and Agricola, were presented anew every year in New England during the period under consideration. The inventor had not dreamed of machines for planting, cultivating, and harvesting field crops.

There was little of what could be called commercial farming in the northern states at that time. Farmers who were located near the seacoast, or near a navigable river, could always dispose of their surplus products to good advantage and at fair prices. But such was not the case with farmers who lived a long distance from water communications. They could drive their cattle to market, but the price of their grain was consumed in hauling it a hundred miles, while their apples and potatoes would not be accepted as gifts. There was often great scarcity of some product of which there was an abundance in a locality two hundred miles away. Wool was almost the only article that could be transported a long distance without having its price absorbed in the cost of cartage. There were no railroads. The earth roads were poor, and oxen were generally employed to draw farm products to market.

NOTE.—Lack of markets or means to reach them were conditions found in all sections of the country during the period of settlement.

In Ohio—

> There was little inducement to cultivate the soil in those days, except to produce what the family consumed and what would support the stock and pay the taxes—the latter, the farmer very frequently not being able to realize enough of money from his crops to do. There was no market at home, no foreign demand, and if there had been, it would have been beyond their reach. The opening of the Ohio canal in 1827 was the first godsend to the early settlers of the county, and after that the completion of the P., Ft. W. & C. R. R. imparted value to every product of the farm [Ben Douglass, *History of Wayne County, Ohio*, pp. 191–95].

In Missouri in 1826—

> The difficulty of finding a market for the surplus produce is not a diminutive evil. There is not that ease and certainty of raising a small sum of money by sending the articles of the farm to a sure market. All articles of life in Illinois and Missouri have been, for some years, below what the planters could afford to raise them for, with any view beyond domestic consumption. There is a great abundance and variety of wild fowl and turkeys. A Missouri planter, with a moderate force and a good plantation, can be as independent as it is fit that we should be. He can

raise the materials for manufacturing his own clothing. He has the greatest abundance of everything within himself except those articles not naturally congenial to the climate [Timothy Flint, *Recollections of the Last Ten Years*, pp. 247–49].

In Iowa, from 1840 to 1850, very little money was paid out for wages. The amount of money in circulation was small, pioneers were poor and inclined to do their own work, and as farmers exchanged the products of their farms in barter, laborers when hired were largely paid in produce [*Bulletin 99, Bureau of Statistics, U.S. Department of Agriculture*].—EDITOR.

15. PASTORAL LIFE ON THE AGRICULTURAL FRONTIER[1]

BY RAY STANNARD BAKER

The cattleman followed the hunter, spreading rapidly from Texas, Kansas, and Nebraska, westward and northward over all the range states—New Mexico, Arizona, California, Nevada, Utah, Colorado, Wyoming, and the western part of the Dakotas, Montana, Idaho, Oregon, and Washington—to each state according to its grassland. In those days of the first invasion it was all a golden land. "Here," said the cattleman, "is food for all the cows in the world." So he began raising vast herds, and they multiplied and spread like locusts, for the grass and the water were both free, and horses were to be had for the catching. He thrived abundantly—at first. No restrictions hemmed him in save those conveniently set by his own conscience or inspired by respect for his neighbor's six-shooter. It was a glorious primitive society.

To be a cowman meant being a small but powerful king, with a princely kingdom. There was no rent and virtually no taxes to pay. A man might own a hundred thousand cattle and not an acre of land, though he claimed "range rights" to fifty thousand acres, and enforced those rights with blood and iron. Apparently this was a new sort of free life in which man had risen above the old slow rules of thrift. It was a simple business: turn the cattle to grass, and when money was needed, round them up and sell them.

Presently, however, the first real settlers, the "nesters" of Texas, who wished to fence the land for farms, appeared in numbers, and the early comers, the original cowboys, began to chafe. "Who's elbowing me?" they enquired, and there was prompt and effective shooting and the wholesale cutting of the new fences. Likewise, there came the

[1] Adapted from "The Tragedy of the Range," *Century*, LXIV, 536–41. (Copyright by the Century Co.)

competition of the sheepman. Vast flocks appeared on the range, burning across it like so much live fire, the sheep eating out the vegetation to its very roots. It became a common experience for a cattleman to be "sheeped," as he called it, and it was not surprising that he looked coldly on the sheepmen and their flocks. On the other hand, the sheepmen asserted, truly enough, that the land belonged to the government, not to the cattleman; that it was free range; that the sheep had as much right there as the cows. Result, six-shooters, as usual. In some cases the cowboys fortified the water-holes, preventing the sheep from drinking, and hundreds died terribly of thirst. In other cases, more bold, they rushed in, shot down the shepherds, and "rustled" the sheep to their death over some precipice, or killed them by shooting. It was no man's land; therefore might was right. But sometimes the range was eaten so bare that the cattlemen lost interest and sold out to the sheepman, and let him have his way.

But today the new Westerner has come. Jack, the cowboy, has had his fling: the time is near when he will shoot up a town or rope a constable for the last time. And the man who follows him is quite a different person—not so picturesque by a long way, not so carelessly free, a person whom Jack despises with all his big, warm, foolish heart, and dreads with all his unpractical head. For Mr. Brown is from Kansas—or is it Wisconsin?—a practical, unpoetic man, who wears suspenders and a derby hat, whose rear pocket bulges with no six-shooter. He is wholly without respect for range boundaries set by honorable custom; he looks up his rights in a calfskin lawbook and sets down his expenditures in a small red book, so that he can tell at the end of the year how much he has made or lost. One of his chief weapons is the barbed-wire fence, which he strings ruthlessly along the rivers or around his leased school land, where cattle once roamed free. Kill him and be done with it, but the next day comes Mr. Smith from Ohio, and with him Mr. John Doe, of Boston, doing the same despicable things, as Jack sees them. Is there no end of them? And killing, unfortunately, grows unpopular; even dangerous.

Yes, Smith has come, scattering homes with women in them; tomorrow he will build a cheap little church, spireless but hopeful; he will have his schoolhouse and his justice-court. Do not imagine for a moment that Smith is a philanthropist, or that, feeling shame for the ruin of a splendid empire, he is setting himself with deliberate patriotism to save it. By no means. Smith is as healthily selfish as

Jack himself, but his interests cry for law and order; for the private and peaceful possession of land instead of a bloody and wasteful free range; for homes instead of tents.

NOTE.—This pastoral period in the development of the West was but typical of what happened in all sections of the country. The ranchers were the advance guard of the army of agriculture, and grazing was the transition stage between hunting and trapping, and settled agriculture. Professor Turner tells us[1] that there was such a "rancher's frontier" in Virginia at the close of the seventeenth century. "Travelers of the eighteenth century found the 'cow pens' among the canebrakes and pea-vine pastures of the South and the 'cow drivers' took their droves to Charleston, Philadelphia, New York. Travelers at the close of the War of 1812 met droves of more than a thousand cattle and swine from the interior of Ohio going to Pennsylvania to fatten for the Philadelphia market." Thence the rancher was crowded on to new frontiers beyond the Mississippi, out upon the semi-arid plains and up into the mountains. Today he retains but little land which is suitable to more intensive uses.—EDITOR.

G. The Transition to Commercialized Agriculture

16. THE OLD FARMER AND THE NEW[2]

BY KENYON L. BUTTERFIELD

The old farmer was a pioneer, and he had all the courage, enterprise, and resourcefulness of the pioneer. He owned and controlled everything in sight. Half a century ago, in the Middle West, the strong men and the influential families were largely farmers.

The new farmer lives in a day when the nation is not purely an agricultural nation, but is also a manufacturing and a trading nation. But he realizes that out of this seeming decline of agriculture grow his best opportunities. He discards pioneer methods because pioneering is not now an effective art.

Economically, the old farmer was not a business man, but a barterer. The rule of barter still survives in the country grocery where butter and eggs are traded for sugar and salt. The old farmer was industrially self-sufficient. He did not farm on a commercial basis.

[1] *The Significance of the Frontier in American History.*

[2] Adapted from *Chapters in Rural Progress*, pp. 54–61. (The University of Chicago Press.)

He raised apples for eating and for cider, not for market—there was no apple market. He had very little ready money; he bought and sold few products. Even his grain, which afterward became the farmer's great cash crop, was raised in small quantities and ground at the nearest mill—not for export, but for a return migration to the family flour-barrel.

The new farmer has kept pace with our industrial evolution. When the régime of barter passed away, he ceased to barter. When the world's market became a fact, he raised wheat for the world's market. As agriculture became a business, he became a business man. As agricultural science began to contribute to the art of farming, he studied applied science. As alertness and enterprise began to be indispensable in commercial activity, he grew alert and enterprising.

But it is not sufficient to picture the new farmer. You must explain him. What is it that makes the new farmer? Who is he? What are his tools? Of course, you must observe the individual traits that characterize the new farmer, such as keenness, business instinct, readiness to adopt new methods, and, in fact, all the qualities that make a man a success today in any calling. For the new farmer, in respect to his personal qualities, is not a sport, a phenomenon. He does not stand out as a distinct and peculiar specimen. He is a successful American citizen who grows corn instead of making steel rails.

But you have not yet explained the new farmer. These personal traits do not explain him. It may be possible to explain an individual and his success by calling attention to his characterisitics, and yet you cannot completely analyze him and his career unless you understand the conditions under which he works—the industrial and social environment. Much less can you explain a class of people by describing their personal characteristics. You must reach out into the great current of life that is about them and discern the direction and power of that current.

Now, the conditions that tend to make the new farmer possible may be grouped in an old-fashioned way under two heads. In the old scientific phrases the two forces that make the new farmer are the "struggle for life" and "environment," or, to use other words, competition and opportunity.

Competition has pressed severely upon the farmer—competition at home and competition from other countries. At one time the

heart of the wheat-growing industry of this country was near Rochester, New York, in the Genesee Valley; but the canal and the railway soon made possible the occupation of the great granary of the West. A multitude of ambitious young men soon took possession of that granary, and the flour-mills were moved from Rochester to Minneapolis. This is an old story, but the same forces are still at work. The sheep of the Australian bush have become competitors of the flocks that feed upon the green Vermont mountains and the Ohio hills. The plains of Argentina grow wheat for London. Russia, Siberia, and India pour a constant stream of golden grain into the industrial centers of Western Europe, and the price of American wheat is fixed in London. These forces have produced still another kind of competition, namely, specialization among farmers. Localities particularly adapted to special crops are becoming centers where skill and intelligence bring the industry to its height. The truck-farming of the South Atlantic region, the fruit growing of western Michigan, the butter factories of Wisconsin and Minnesota, have crowded almost to suffocation the small market-gardener of the northern town, the man with a dozen peach trees, and the farmer who keeps two cows and trades the surplus butter for calico. These things have absolutely forced progress upon the farmer. It is indeed a "struggle for life." Out of it comes the "survival of the fittest," and the fittest is the new farmer.

But along with competition has come opportunity. Indeed, out of these very facts that have made competition so strenuous spring the most marvelous opportunities for the progressive farmer. Specialization brings out the best that there is in the locality and the man. It gives a chance to apply science to farming. Our transportation system permits the peach-growers of Grand Rapids to place their crops at a profit in the markets of Buffalo and Pittsburgh; the rich orchards and vineyards of California find their chief outlet in the cities of the manufacturing Northeast—three thousand miles away. During the forty years, from 1860, the exports of wheat from this country increased from four million bushels annually to one hundred and forty million bushels; of corn, from three and one-third million bushels to one hundred and seventy-five million bushels; of beef products, from twenty million pounds to three hundred and seventy million pounds; of pork products, from ninety-eight million pounds to seventeen hundred million pounds. And not only do the grain and stock farmers find this outlet for their surplus products, but we are

beginning to ship abroad high-grade fruit and first-class dairy products in considerable quantities. Low rates of freight, modern methods of refrigeration, express freight trains, fast freight steamers—the whole machinery of the commercial and financial world are at the service of the new farmer.

17. WHERE THE PRINCIPLE OF EXCHANGE-PRODUCTION HAS BEEN ABUSED[1]

By MRS. G. H. MATHIS

There is nothing on the face of the earth, in our climate or in our soil, that forces Alabama into a one-crop system. We can grow anything that will grow in the temperate zone. But still we do a whole lot of nonsensical things; we just get right in our own way and keep a-standing there. In the first place, we send here to St. Louis, Chicago, and Kansas City, and we buy meat, ham, breakfast bacon, and all sorts of hog meat, and we pay anywhere from 12 to 30 cents a pound, and we can grow all we want at 2½ cents. It is a fact; get our agricultural bulletins and see that we can. And we send and buy beef and we pay all sorts of prices for it, 10, 20, and sometimes 40 cents a pound, and we can grow that same beef at 4 cents or less. And then we send out West and we buy hay, and we pay anywhere from $15 to $26 a ton, and $16 of that money is freight and goes to the railroad, and $4 of it goes to the middleman who handles it, and the fellow who grows the hay gets $6 a ton, and we don't care a cent who gets the money, just so we get rid of it. And we grow that hay for $1.50 a ton. Now talk about us shipping hay into Alabama. Why, we have to work ourselves to death to keep from growing hay. We have to kill the grass to grow the cotton to buy the grass, and we haven't had time to see what else we could do. And when it comes to corn, we have got the world's record on corn beat—232½ bushels to the acre. Alabama is the natural home of corn.

Note.—Plenty of other illustrations might be cited of the same failure to produce for home consumption in other one-crop sections. The wheat farmer of Minnesota or Dakota has become so much engrossed in raising his single cash product that he has neglected to set out fruit trees or even cultivate a garden, but has bought his food in tin cans at the grocery in town. Likewise, the Northwest has sold

[1] Adapted from an address delivered at the Second Annual Convention of the Farm Mortgage Bankers' Association, St. Louis, October 7 and 8, 1915.

alfalfa hay to the Wisconsin dairyman at $1.50 a ton and then imported Wisconsin butter at 40 cents or more a pound—bringing coals to Newcastle in that natural dairy country.

But today the farmer of the North and West is adding animals enough at least to consume products that would otherwise go practically to waste, and "general farming" is largely displacing one-crop methods. At the South diversification has been the cry for several years. The newer slogan, "Safe Farming," brings out well the likenesses and differences between agriculture and other lines of production, such as manufacturing. Safe farming means raising "food and feed crops" in quantity sufficient to the farmer's home needs. Such crops are not unlike the by-products of the factory, since they utilize time, much of which could not otherwise be turned to good advantage, and likewise use low-value or waste products as roughage, or secure a good return from pasture land that would otherwise yield no product. The factory sells its by-products; the farmer consumes his in the business. But both specialize in a marketable product. Safe farming does not mean a return to the inefficiencies of the self-sufficing régime, nor the abandonment of cotton or some other cash crop.—EDITOR.

18. THE POSITION OF THE FARMER IN OUR ECONOMIC SOCIETY[1]

BY EDWARD F. ADAMS

The farmer has been prone to rely too much upon a partisan press, and the utterances of political and other orators, who seek to accomplish some present end by exciting and increasing his prejudices. As a result, the farmer is continually at a disadvantage in his pecuniary dealings with those better informed than he as to the trend of commercial movements. The only remedy for the farmer is a study of fundamental principles, in the light of which he may correctly read the meaning of current events.

A study of the business relations of the farmer takes us far from the farm. The farmer's interests are intertwined with all other interests. The great social and commercial movements of the day are matters of dollars and cents to the farmer. Whatever concerns the farmer concerns all mankind, and whatever affects other classes

[1] Adapted from *The Modern Farmer in His Business Relations*, pp. 7, 8, 15–17, 32–38. (Copyright by Edward F. Adams. Published by N. J. Stone Co.)

reacts upon him, and this not merely in an esoteric sense, but in the dollars and cents which he pays out. What occurs on and about the farm the farmer can see, understand, and in some measure control. What occurs elsewhere, however profoundly it may affect him, he may never even hear of and can hardly influence at all. It is essential that the farmer know more than he does of those distant forces, because it is necessary that he adjust himself to conditions which he cannot control. The farmer, for example, cannot control the operations of railroad magnates, the machinations of speculators on grain exchanges, the rate of discount at the Bank of England, or the standard of life of the Indian ryot, but all these help to determine the price he shall receive for his wheat and what he shall pay for the supplies he needs. The intent of this book is to set him thinking more about such things.

The new farmer is primarily a business man. He is assumed to know how to make crops grow, and usually he does. The main question is whether he knows how to produce crops which will sell for more than they have cost. If he cannot in the long run do this, his inevitable destiny is to become the servant of someone who knows how to direct his labor to profitable results. Below this lies the problem as to whether the majority of men possess the business ability requisite to successful farming under modern conditions, and upon the answer to this question depends the future of our rural civilization. If it be decided in the affirmative, the race of independent small farmers will continue; if in the negative, farm labor will come to be exploited by able men conducting huge agricultural operations, just as mechanical labor is now exploited by captains of industry.

In this age the simple but independent life of the pioneer farmer is no longer possible in America, nor, with our changed habits and desires, would it be agreeable. It would involve a distinct lowering of our present standard of comfort, which, with all our complaint, is far higher than formerly, and would not result in the same content and consequent survival which the same conditions formerly induced. The impossibility of the life will be seen by any farmer who will trace out what would happen should he attempt it. Doubtless the farmer could produce more for his own consumption than he does, but, in the main, under the changed conditions of modern life, he is compelled to sell for money most of his products and buy for money most that he consumes. The mechanical facilities of modern times have enormously reduced the cost of production, and improved transportation

has made every farmer of the civilized world the competitor of every other farmer in the sale of products consumed at his own door, and he who can produce cheapest will survive. The farmer, therefore, must have the best machinery and make it available over the largest possible area, and this, again, restricts the small farmer at least to the production of the specialty best adapted to his location. There is another reason for this: formerly, when his surplus product was consumed near by, he could know the capacity of his market and the competition to be expected; now, when his surplus is often consumed many thousands of miles away and sold at the price fixed by the competition of the world, it is very difficult for any farmer to inform himself of the probable profit of production of many articles. And yet this knowledge, while far more difficult than formerly for the farmer to obtain, is far more essential, because, while formerly the farmer was interested in the money value of but a small portion of his product, he is now interested in the money value of nearly all of it.

Still other elements now have to be considered by the farmer. The increased use of money involves borrowing and debt. With proper business knowledge, borrowing is legitimate and profitable to the borrower; nearly all business men are large borrowers; but borrowing in excess of the knowledge to use wisely involves risk, paid for by high interest, and often leads to disaster. The farmer, unaware of his ignorance, has become greatly indebted, and is now profoundly interested in a stable currency. From being a very small buyer he has become a very large one, and is vitally interested in the control of trusts and other combinations affecting the price of the necessities of life. As all that he sells and all that he buys are necessarily transported over the great routes of commerce, he has come to have a money interest in the conduct and control of transportation companies. Paying more taxes than he did, the farmer is more interested in the maintenance of a just system of taxation and the economical conduct of all public affairs. All these and kindred subjects form part of the great science of economics, as to which it is highly necessary that the farmer be well informed in order, in the conduct of his business and by his vote when necessary, intelligently to protect his own interests.

It appears, then, that from being a producer and manufacturer on a small scale for the home market he has become a producer and merchant on a large scale for the markets of the world. While once little knowledge would serve him, and that mostly such as his own

observation could supply, it is now essential that he be a broadly educated man, familiar with the conditions affecting his own business in all parts of the world. Henceforward the successful farmers will be only those so educated; the weaker farmers will be those who direct their labors least wisely; these, again, will be those who know least. It is therefore a logical necessity that those farmers who expect to live as such shall adapt themselves to their changed environment by acquiring the information necessary to enable them to sustain themselves under their changed conditions.

Farmers are apt to denounce the great salaries paid in some walks of life, but they are nearly always the price paid for knowledge at market rates. The farmer who prefers the life of a banker has merely to know better than anyone else what property is safest to lend money on, and to make his ability known; some bank will soon want him. Farmers are large borrowers, and as they are apt to seek loans which they have not the knowledge to use wisely, the bank president must be a better judge of the possible profits of farming than the farmer himself, lest the bank's funds be invested where they cannot be got back when wanted. This means a high salary for the bank officer, which goes to reduce the profit of the farmer, for ignorance must pay its own bills. If farmers could know enough about their own business to make loans to them certain to be so wisely used as to pay interest promptly and the principal at maturity, a less expensive man could lend them money, and the farmer's profits be so much increased.

I simply record my own judgment, which is that the farmer has ceased to be the independent man whom I knew in my boyhood. He is attacked by the care and worry of the business man, without the business man's equipment to meet them, and he is losing ground. We are being distanced, not by greater strength, but by a wiser use of strength. Other classes know better than we what it will pay to do or avoid. This knowledge comes, not by vague speculation, but by the mastery of facts. We farmers reason well enough upon what we think to be true, but we are so often mistaken in our facts that we are as apt to be led into doing unprofitable things as into attempting those which are profitable.

So long as the farmer is on virgin soils in a growing country with extending markets a knowledge of the ordinary farm practice of the locality serves his purpose very well. But the modern farmer does not live under such conditions. He lives, for the most part, upon deteriorated soils, in communities which seem to have gotten their

growth. There are no longer new settlers coming in to make a home market for produce. It seems harder, for some reason, to get on. First of all, the farmer needs to know how to reduce the cost of his products. The prices he cannot control. He finds his margin of profit insufficient. His one resource is to reduce costs. The farmer is now only passing through an experience which all other industries have encountered, but from which until lately the American farmer has been exempt. When he inquires how costs of manufactured articles have been reduced, he will find that in every instance it is the work of scientific men—mainly engineers and chemists. When he understands this, he should at once be prepared to expect aid from the same source. And he is getting it from that source. All that we know as to commercial fertilizers we have learned from the chemists. The entomologists and botanists have learned the life-histories of injurious insects and fungi, and the chemists have compounded the materials for combating them. The veterinarian and entomologist have located the cause of Texas fever in a parasite which the chemist has taught us how to destroy, as he long since taught us how to eradicate sheep scab. The physicist has learned how soils are formed, has definitely classified them according to the size of their particles, and discovered precisely how water behaves in the different classes. This aids the farmers who understand such things to plant and till crops with better judgment.

But all this is only one aspect of the case. While the art of production is possessed in some degree by all farmers, very little is known by them of the science of marketing, and the art of maintaining businesslike methods is hardly understood at all. In the matter of reducing costs, for example, very few farmers know the cost of anything which they produce. The subject of reducing the cost of a product can only be intelligently approached upon the basis of a record of the details of present costs. It is not necessary to enlarge upon this, for every farmer knows it. He does not keep these records in America, because hitherto he has been able to live without it. A merchant who has no competition within fifty miles need not know his costs very accurately, for his selling price will be high enough to cover waste, but to the merchant in a busy town every item of cost is essential and is duly recorded. Increasing competition and deteriorating soils make this equally essential to the modern farmer.

I must place, as not only first, but far more important than all other business information, the knowledge of what his competitor is

doing. It is the most important thing for any business man to know. It is the matter about which most farmers never think. In so far as one knows the cost of his own products, those of his competitors, and the cost of the transportation which each must bear, he is fairly well equipped as a producer and seller. He can judge what it will pay him to produce. A wise producer also understands eixsting demand and seeks to learn whether he can profitably fill it. But, in addition to the mere question of marketing, the farmer's net income is affected in hundreds of ways by forces which he may, if he will, understand. Society itself is a product of an evolution not yet complete. Its development is proceeding according to natural laws, some of which, at any rate, we can perceive. The science which deals with these phenomena of society which most directly affect men's incomes is called "economics." It considers such questions as taxation, banking, co-operation, transportation, currency, commerce in all its forms, and kindred topics, many of them subject to political action. The farmer needs to understand these subjects as they really are, not only that he may think and vote intelligently, but that he may not wear his heart out in struggling with imaginary causes of evil or with economic tendencies which cannot be changed. A great part of the education which is the hope of the farmer lies right here. It is a part that has been too much neglected.

II

CONSUMPTION

Introduction

The attempt to gather materials on the subject of consumption is beset with serious difficulties. Most writers have directed their attention toward productive and distributive aspects of our economic life rather than toward those which have to do with the consumption of wealth. Some have analyzed the conditions of productive operation and have attempted to formulate principles by which efficiency in wealth production may be achieved. Others have defined economics wholly in terms of the price-making process and have asserted that consumption has no part in this science of economics. From both these points of view the present writer would venture to differ.

For even though the goal one sets up as the ultimate purpose of economic study be efficiency in production, the product must be measured, not in terms of goods as such, but in terms of satisfiers of human wants. If we desire to increase those satisfactions, two courses are open to us. One of these is to improve our means of production, so that more effective use is made of natural resources, human labor, and capital goods. But we must not forget also that we have another means to the same end, and that is by changing the character of our consumption.

If, on the other hand, we choose to regard economics as the science of the price-making process, consideration of the facts of consumption is not less important. For prices of goods must be made in accordance with consumers' estimates of their utilities, modified by the purchasing power which buyers derive from the incomes they receive as the price of their labor or for the use of their property—land or capital. We shall not get very far in either the theoretical understanding or the practical control of marketing activities without careful study of the phenomena of demand as created by the consumer.

The aim of any rational consumption of wealth is to secure the greatest amount of well-being possible from limited resources. Evi-

dently, then, attention is not less needed in reviewing and, perchance, revising the consumer's demand for products of the soil than in improving the farmer's material and intellectual equipment for increasing their supply. As Professor Patten points out, a given amount of effort directed to one sort of food production will produce, let us say, twice as much of food value as the same amount of effort directed toward the growing of another article. This fact being known, mere common-sense dictates the selection of the product which makes the lighter demands upon soil, muscle, and equipment. Obviously, the acquiring and applying of knowledge as to which types of consumption impose the lightest burden upon agriculture are indispensable to our fullest prosperity.

For example, let us say that we have a great working population who find it hard to make their labor produce enough of certain essential food materials for their physical well-being. Under such conditions it is highly important to try to improve the character or organization of their productive labors so that they can raise more wheat for starch and more beef for protein, to improve their diet and thereby their bodily welfare. But it is no less important to examine the nature of our physiological needs and to analyze the properties of other than the conventional articles of diet, in order to find other products which will furnish these necessary substances, but in whose production the same amount of labor, land, and capital will secure a greater product than in the case of those formerly consumed.

Undoubtedly we have been very extravagant in our use of many of the products of our economic labors. We used to put cotton-seed upon the land as fertilizer for the growing of other crops. Then we began to feed it to stock, for the production of meat. Now we are seriously broaching the question of consuming it directly in our diet, instead of using it in more roundabout and wasteful methods of securing human food. This effort is quite analogous to that of the manufacturer who is always seeking cheaper materials and more direct methods for the carrying out of his industrial process. It is distinctly an economic phenomenon, and as such should be included in our study.

Furthermore, the man who is concerned only in securing the maximum product from natural resources must realize that one of the factors in his problem is the desire or willingness of the public to consume this, that, or another particular, and perhaps unfamiliar, product. The latter part of selection 26*a* well illustrates this point. The writer suggests that lands adapted to raising grapefruit will be likely to

remain waste lands unless the public can be persuaded to increase their consumption of grapefruit. The same may be said concerning other sections. Wisconsin bog lands are unsuited to ordinary types of farming, but if the cranberry be made a more important item in the customary family diet such lands become a productive resource, and our general agricultural efficiency is enlarged by so much.

Such facts raise some very interesting issues. The producer seeks to divert the public's consumption to the particular article whose production would be most advantageous to him. In so far as this means the utilization of resources otherwise going to waste or unprofitably employed, a social as well as an individual gain results. But if, by skilful advertising, the grower causes his product to displace others produced at less social cost, his gain means others' loss. For this reason there is much need of wise instruction as to the consumptive value of the various articles offered the public for their selection. Each buyer should carefully consider the application of such general principles to his particular circumstances. It is worthy of note that the raisin-growers of California, in their $160,000 advertising campaign, thought it expedient to base their appeal on the food value of their product. The bases of the peach and citrus-fruit propaganda might well be scrutinized.

But what shall, in the last analysis, be the standard of our judgments, determining our choices and rejections? Are food analyses, with results stated in terms of calories, an adequate guide to the fullest satisfaction of food wants? Starch and protein are not the immediate ingredients of human happiness, and a diet that the food chemist grades 100 per cent as a source of fuel and energy may stand much below par as a source of well-being to the individual consumer. In fact, "well-being" is not a term whose meaning is plain and well established. Rather, it is in process of slow adjudication in the court of popular opinion. Professor Patten seems oblivious to the fact that his choice of *objective* standards of consumption might not meet with general acceptance. If I object to the exclusion of all beverages, you possibly feel that the deletion of tobacco cannot be compensated by however large an increment of wheat or oats. Probably we both balk at rye bread, and find that every increase in the percentage of potatoes robs our lives of joy by a much more than proportionate amount. We are in practice convinced that a relatively costly diet finds a psychological if not a chemical justification. But on the other hand, no one of open mind can avoid the perception that many of the costs incurred in connection with our accustomed schedules of consumption are due

to ignorance of the relative qualities of different products or wilful blindness to the results of their use. The individual consumer, whose demand is the ultimate force in shaping the character of our agricultural production, remains surprisingly aloof from intelligent criticism of the worth (physiological or other) of his own personal or *subjective* estimates of want. The more ignorant he is the more does he insist on giving to those raw desires the *objective* form of dollars offered in the market. And against this "effective demand" no consideration of social cost can prevail. The individual farmer must follow the dictates of market price if he is to succeed in his commercialized enterprise of farming.

Whether as economic theorists or as practical producers and sellers of farm products, we have as yet done little more than scratch the surface of this question of consumption. But it is evident that the character of consumers' wants, the possibility of modifying those wants, the limits of that possibility, and the results which flow from one sort or another of consumption standards, are problems well worth the attention of whoever is interested in the business of agriculture. Concrete evidence of the significance of this last point is given by the efforts of the "wet" interests to demonstrate that prohibition would mean widespread agricultural loss.

But the farmer's personal problem of consumption is likewise worthy of attention. An income of one thousand dollars well spent will go a great deal farther toward securing the satisfaction of wants than a much larger sum badly spent. Taken in the large, the American farmer has been deprived of the chance to learn how to spend. Going upon the land empty-handed, he has had to save and save, to devote the year's dividend to the accumulation of capital rather than to the increase of satisfaction through consumption. The pioneer's family curtailed its use of meat that the farm might be more rapidly stocked with cattle, or denied itself furniture that a mower or binder might be bought. The need for capital in agriculture was being increased through the very years that moneyless men were seeking to establish themselves as independent farmers on the lands of the United States. No praise is too great for the self-denial by which that needed capital was accumulated. But the situation of farm folk today is changed or changing. Such uses of income were productive expenditures, and now that the time has arrived when a new generation can clip the coupons from that investment the problem of how to spend shares in importance with that of how to save.

At this juncture Professor Carver's distinction between an efficient standard of consumption and one that is merely expensive is worthy of serious attention. Purveyors of goods are alert to exploit the new-found purchasing power of the countryman. If spending follows the line of least resistance, it will doubtless be copied from the consumptive standards of the city. But many writers have deplored such an event, and maintain that the country must evolve for itself different canons of consumption derived from a shrewd examination of its own peculiar needs. City folk have outdistanced their country cousins in the matter of home comforts and sanitation; they have larger resources of education, music, art, and social life. But they have also a stimulus to feverish competition in the matter of stylishly unserviceable and unbecoming clothes; and a monstrous machinery for making light and noise, endlessly to tease the nerves of urban dwellers and dull their taste for quieter enjoyments. Among these rival allurements the countryman needs to keep a steady head if he is to enrich his life most fully and avoid the dissipation of his resources in unreflective imitation of others' standards, or through limply yielding to any form of vigorous solicitation.

The new consumption standards of the country may well hope to achieve a self-reliant eclecticism amid the wide variety of choices open to it.

Note to Economists.—While conscious of the shortcomings of this chapter, the editor yet hopes that it may serve to show some significant bearings of this part of our subject upon the others. If, in addition to this, it should serve to start constructive thinking along these lines, its purpose would be fully served. It has seemed wiser to offer even an inadequate chapter than none at all. We can at least hold down the claim that the earlier economists staked out, against the day when someone shall come to cultivate it more productively.

A. General Principles

19. ECONOMIC LAWS OF CONSUMPTION[1]

By HENRY R. SEAGER

As one of the main divisions of economics, consumption treats of the relations between wants and the means to their gratification, goods. The characteristics of wants first demand attention.

[1] Adapted from *Principles of Economics*, pp. 70–87. (Copyright by Henry Holt & Co.)

It is a familiar fact of human experience that wants are indefinitely numerous. Every day, in the consciousness of every normal person, many wants for commodities and services are felt which must of necessity go ungratified. Upon this simple fact is based the law that *the consuming power of a community is indefinitely great.* A second familiar characteristic of wants is that they are of very different degrees of intensity. This is realized as soon as one tries to arrange all the wants of which he is conscious in a scale according to their importance. Such an endeavor reveals also the difficulty of measuring wants and the complexity of those which direct daily life. Corresponding to every want that comes within the scope of economics is a utility or combination of utilities capable of gratifying it. The intensities of wants determine degrees of utility and thus, as is shown later, have great influence in fixing the values of the economic goods in which utilities are embodied. Variable as they are in intensity, all wants are subject to a law of gradual diminution and final satiety as consumption is continued. Upon this psychological principle is based an economic law of considerable importance, that of *diminishing utility.* We may formulate it as follows: *the utilities of additional units of any good to any consumer diminish normally as his supply of units of that good increases.* This law assumes, of course, that no change takes place in the character of the consumer as his supply is being increased.

The normal purpose of consumption is to afford pleasure. Since each kind of good is subject to the law of diminishing utility, the pleasures of consumption may be increased by attention to the *law of variety.* If a man has only corn bread for breakfast, to satisfy his hunger he must push his consumption of it beyond the point where it affords him appreciable gratification. If to his corn bread are added bacon, eggs, and coffee, he will be able to supply his body with adequate nourishment without being obliged to eat corn bread after he has ceased to relish it. Eating has been taken to illustrate the law of variety because it is a universal experience, but the law applies equally well to other forms of consumption. It is really a corollary of the law of diminishing utility, since that law itself suggests the necessity of passing from one form of consumption to another to avoid the uncomfortable feeling of satiety. The ideal which the economic man should, and does unconsciously, have in mind is that of carrying each kind of consumption only to the point where it becomes less pleasurable than another form of consumption that may be enjoyed at the same expense. By changing to the new form of

consumption whenever it affords the more pleasure he is able to get the maximum gratification permitted by his income.

The great obstacle to varied consumption is the expense of a varied assortment of goods, and this is felt most keenly where men live in comparative isolation. Homesteaders in the western part of the United States, and others in similar situations, have to content themselves with rough and simple fare, clothing, etc., because it does not pay them to make, in the small quantities adapted to their wants, those little things which contribute so much to the refinement of life. Every advance which tends to bring people into closer industrial relations is favorable to a more varied consumption and consequently to an increase in well-being. Recent improvements in transportation facilities and means of communication encourage the hope that the varied markets of the city will one day be brought within the reach of every country family, while the city families will be given opportunities to share the free goods of the country. Such an arrangement will add enormously to the general well-being.

A third aspect of consumption involves its relation to production. It is important, by attention to the laws of varied and harmonious consumption, to obtain the largest possible return from the stocks of goods available for consumption. It is equally important, while securing a given return of pleasure from consumption, to select those goods which can be produced with the least expenditure of effort. This is the *law of least social cost.* Its first application has reference to the natural conditions of a country.

Economic progress depends in part on the adaptations of men's wants to the productive capacities of the particular regions which they inhabit. When colonists settle in a new country they bring with them a taste for the commodities they were used to at home. The soil and climate of their new environment are rarely suited to the production of these identical things, and hence their well-being depends for some time on the readiness with which they learn to like things for which the new soil and climate are suited. But men do not give up settled habits easily. They waste much time and effort in trying to make the land produce what they like in place of learning to like what the land can best produce. Thus in America it took the early settlers a long time to substitute a diet of Indian corn for the diet of wheat and rye to which they had been accustomed in Europe, and many of their early disappointments were due to their unsuccessful efforts to produce the grains of the Old World.

A second application of the principle of least social cost refers to differences in the capacities and tastes of producers. The things that people want and are willing to pay for are the things that must be produced. As consumers, the members of society determine how they shall, as producers, spend their time and effort. As regards the necessities of life, consumers have perhaps no very great range of choice. They must learn to like those things that can be produced most easily in the given environment. But only a part of the community's income is spent for necessaries. If it prefers as comforts and luxuries articles which can be most advantageously produced in factories where automatic machinery impresses its standards of unvarying uniformity, not only upon the product turned out but also upon the operatives engaged in making these products, then the ranks of factory labor must be crowded and other occupations must be neglected. A community's taste thus gives direction to its work and decides for better or for worse the kinds of lives that its members shall live.

The law of least social cost has still another application. The principle that large-scale production is more economical than small-scale production is subject to important exceptions. In some cases, as, for example, in the production of agricultural products from a limited area, after cultivation has been carried to a certain point to secure more products requires more rather than less proportionate labor. From the viewpoint of social cost, it is obvious that increased consumption of articles of this sort is less advantageous than increased consumption of commodities whose cost decreases as the quantity grows.

The aspect that it is important to note, in connection with all these applications of the law of least social cost, is that the reductions of cost which may be secured by a simple change of wants involves no corresponding reduction in the pleasures of consumption. Consumers continue to be as well off as before, while producers are better off. Thus changes in wants may add to economic well-being just as effectively as changes in methods of production and are quite as worthy of the attention of economists.

The most obvious relation between consumption and production grows out of the fact that consumers are also producers, and what they eat, drink, and wear, the houses they live in, and the amusements they enjoy have a determining influence on their efficiency. At this point attention will be called merely to the economy of different lines of expenditure, especially expenditures for food.

Through ingeniously devised experiments physiologists have attempted to ascertain the amount of nutrition which a normal man requires when engaged in different kinds of work. It is customary to express this as so many calories of heat energy, including so many grams of the indispensable protein, or tissue-building compounds. The daily allowance made for the average man at moderate muscular work by the late Professor Atwater, an American authority in this field of investigation, was 3,500 calories, including at least 125 grams of protein compounds. Men at hard labor and athletes in training require more, while brain workers appear to require somewhat less.

Having established a standard, the next step is to analyze different kinds of food to ascertain their nutritive value. Economical consumption is secured when the cheapest combination of foods containing the required ingredients, and both palatable and digestible for the given consumer, is selected. No general rules can be laid down, because of differences in the tastes and incomes of the different consumers, but it is interesting to note the relation in which the food values of different foods stand to their cost. Professor Atwater drew up a table giving the quantity of each of several kinds of food which might have been purchased for ten cents on a given day in New York City, and the amount of nutrition which each contained. From this it appears that, from the point of view of protein contents, the most economical foods were preparations of wheat, corn, beans, oatmeal, beef for stewing, and salt cod, while, from the point of view of potential heat energy, the most economical were wheat flour, cornmeal, oatmeal, potatoes, beans, salt pork, and sugar. The table seems on the whole to bear out the common impressions that a vegetable diet is much more economical than a diet consisting largely of meat, and that the cereals, wheat, corn, beans, and oats, are the most economical of the vegetables. While the results of Professor Atwater's investigations are highly suggestive, his conclusions are not universally accepted. More recent experiments have shown that a smaller amount of food, *fully masticated*, will maintain a man in fullest vigor. The difficulty of standardizing methods of cooking and of eating—both very important—makes absolutely precise conclusions in this field unattainable.

The subject of consumption may be looked at economically in two different ways. The more familiar way is to regard it as the goal of economic activity and to show how the desire for goods causes them to have value and price and induces people to engage in industrial pur-

suits. Though perfectly valid so far as it goes, this aspect of consumption must not be exaggerated. The other way of looking at it is as a means of restoring energy. The consumption of goods necessary to efficiency is not merely an end; it is a means to further production. Human beings are not mere goods-consuming automatons. They enjoy activity for its own sake, and the more highly developed they are the more they are likely to look upon goods as means to the forms of activity they prefer rather than as ends in themselves. It follows that desire for goods is only one, if the most important, of the motives which control the economic man. Desire for activity is another motive, which in individual instances quite outweighs the desire for goods.

20. THE DYNAMICS OF WEALTH[1]

By F. A. WALKER

Many, indeed most, economists have declined to recognize consumption as a department of political economy; but I cannot but deem it a subject of much regret that the fascinations of the mathematical treatment of economic questions, and the ambition to make political economy an exact science, should have led to the practical excision of the whole department of consumption from so many recent works. For, after all, the chief interest of political economy to the ordinary reader, its chief value to the student of history, must be in the explanation it affords of the advance or the decline in the productive power of nations and communities. It is in the use made of the existing body of wealth that the wealth of the next generation is determined. It matters far less for the future greatness of a nation what is the sum of its wealth today than what are the habits of its people in the daily consumption of that wealth—to what uses those means are devoted.

Malthus has shown us that population will go on increasing as fast and as far as food is provided to support it, all increase of wealth surely taking the form of an increase of numbers unless other and more imperative demands are made upon the income of the family. But let us suppose that, at the point where a competent subsistence is provided to maintain the whole population in health and strength to labor, and in freedom from all discomfort, resulting from privation

[1] Adapted from *Political Economy*, pp. 293–317. (Copyright by Henry Holt & Co.)

of things absolutely necessary, the want of something beyond this comes to be strongly felt by the individual members of the community. Whatever be this passion or desire it makes a demand upon the existing body of goods, or upon the current production of wealth, which at once antagonizes the strong and urgent disposition to the consumption of wealth in the support of an increasing population. Whether this change in the character of consumption shall be made or not is a question upon the answer to which depends the whole economic future of the community.

Until an adequate and sufficiently persistent check upon population has been secured the economist who fully appreciates the consequences of overpopulation can hardly fail to recognize almost every economic want, whatever its origin or its object, as better than none. It has been from this point of view that the English writers have insisted so strongly that cheap food is a thing to be deprecated. Professor Thorold Rogers says: "A community which subsists habitually on dear food is in a position of peculiar advantage, when compared with another which lives on cheap food, one, for instance, which lives on wheat, as contrasted with another which lives on rice or potatoes: and this, quite apart from the prudence or incautiousness of the people."

These economists recognize the strong probability, the almost certainty, that a people will carry their increase closely up to the limits of subsistence according to the kind of food they use, whatever that may be. It may be the lowest and cheapest, like rice in India and potatoes in Ireland. The failure of the crop means starvation, no adequate reserve being expected to be provided on a sufficient scale by the population of any country. If the kind of food be higher and dearer, the masses may, in the event of a failure of the crops concerned, fall back for the time upon the lower and cheaper.

But suppose this danger of the increase of numbers, fast following up subsistence, crowding all the time upon the limits of food, to be once for all past. Suppose we have a community which will accept the opportunity of living upon cheap food and apply the saving to the permanent enlargement of their capital, or to other forms of enjoyment, to dress, to better lodgings, to luxuries, perhaps to expenditures upon education and culture. What harm, then, in cheap food, be it potatoes or rice or the Indian corn of America? Surely none. The more is saved from the cost of food the more can be spent upon making homes ample and comfortable, healthful and decent; the more

can be spent upon schoolhouses and churches, upon books and periodicals, upon literature and music and art. The wife may be let to stay at home and keep the house; the children be given their time to acquire an education and to secure for themselves a thorough preparation for their work in life.

Let me not be understood as quarreling with this potato philosophy of wages so far as the assumption which underlies it, viz., that population will inevitably keep close up to the limits of subsistence on the kind of food, whatever that may be, which forms the popular diet, is justified by the facts of society, as it very widely is. I only claim that, in any country whose people had shown the capability of setting bounds to the increase of population by the exercise of their own judgment and will, cheap food would become a means of increasing the comforts and luxuries enjoyed by that people in other directions of expenditure, or of enlarging the capital and improving the productive agencies at their command.

As a means of checking the increase of numbers, which otherwise would surely carry population to the point of misery, famine, and pestilence, the appearance of almost any economic want must be greeted as a good, without much respect to the origin or object of that want. But the moment the capability of self-limitation of population is assured, the economist discovers wide differences between the various demands for the consumption of the existing body of wealth, made by the differing appetites and desires of different communities, or of different classes in the same community, as regards the influences of those various forms of consuming wealth upon the power and disposition to create values in the future.

It is here we find the body of economic literature most deficient. We need a new Adam Smith, or another Hume, to write the economics of consumption in which would be found the real dynamics of wealth; to trace to their effects upon production the forces which are set in motion by the uses made of wealth; to show how certain forms of consumption clear the mind, strengthen the hand, and elevate the aims of the individual economic agent, while promoting that social order and mutual confidence which are favorable conditions for the complete development and harmonious action of the industrial system; how other forms of consumption debase and debauch man as an economic agent, and introduce disorder and waste into the complicated mechanism of the productive agencies. Here is the opportunity for some great moral philosopher, strictly confining himself to the study

of the economic effects of these causes, denying himself all regard to purely ethical, political, or theological considerations, to write what shall be the most important chapter of political economy, now, alas, almost a blank.

21. FOOD NEEDS AND FOOD HABITS[1]

By C. F. LANGWORTHY

It is often said and is generally believed that we have a generous diet in the United States and that the range in variety of food products is unusually large. Our dietary results from many customs and food habits of the races which have helped to make up our population, but in its general character it is British, as is natural, for the bulk of the earliest settlers were from Great Britain and brought the customs and manners of the old home with them, adapted them to the new country, and passed them on to the succeeding generations.

It is by no means unusual to find misstatements regarding foods and food habits, which only too often pass without question. If really reliable information regarding the food of a family or a race is wanted, it must be secured by means of carefully conducted studies of the kind and amount of food eaten, the results being so expressed that they may be readily compared with other similar data. European investigators began about 1850 to collect such information regarding dietetics and to reduce it to chemical terms. American investigators followed the lead of European scientists, Professor W. O. Atwater being a pioneer in the work, and a great deal of information was accumulated regarding the foods eaten by individuals and groups living under different circumstances.

Foods are used in the body in two ways, namely, to build and repair body tissue and to furnish the body with the energy required for maintaining vital processes and for muscular work. The body cells, which make up all the organs and tissues, contain nitrogenous materials as an essential; hence foods containing this element are an indispensable part of the diet. Nitrogenous foods, such, for instance, as lean meat, egg white, the wheat gluten, etc., contribute also to the energy value of the diet, but the body depends for its energy very largely upon fats and carbohydrates, a given quantity of fat, for

[1] Adapted from "Food and Diet in the United States," *Yearbook of the Department of Agriculture*, 1907, pp. 361–78.

instance that of butter, yielding two and one-fourth times as much energy as a like amount of carbohydrates, such as starch, sugar, etc.

In the methods usually followed in expressing the results of dietary studies the functions of food, as expressed above, are had in mind, and the results attempt to show the value of the daily ration as a tissue-former and an energy-yielder. The results of dietary studies and the dietary standards deduced from them have been very commonly expressed in terms of protein, fat, and carbohydrates. It is, however, simpler to express the results in terms of protein and energy only, and this is now more usually done, as these factors give data regarding both functions of the diet and constitute the simplest basis on which different foods, rations, standards, etc., can be compared. The proportions which are usually consumed in the American diet are not far from 150 grams fat, and 350 grams carbohydrates, per 100 grams protein.

The results of dietary studies made throughout the United States do not indicate any probability of general undernutrition, but it can be said with equal fairness that there were many opportunities for improvement as regards the rational selection of foods, economical preparation and use, and similar lines. The waste in the average American home ranges from nothing to as high as 20 per cent of the food purchased. A fair average would be about 10 per cent.

A summary of data based on the results of about 400 studies of the diet of the average American home indicate that: 48 per cent of the total protein is supplied by animal foods; 52 per cent of the total protein is supplied by vegetable foods; 11 per cent of the total fat is supplied by vegetables; 26 per cent of the total fat is supplied by milk and cream; 42 per cent of the total fat is supplied by pork and lard.

Meats and poultry together furnish about twice as much protein as the other animal foods, and beef and veal together furnish about half the total amount supplied by the entire group.

Other things being equal, the cost of the daily food is determined by the proportion of the total expended for such stable articles as bread, meat, butter, eggs, and common vegetables and the expenditure for accessory foods, such as expensive fruit, out-of-season vegetables, fancy sweets, etc., which, as ordinarily used, contribute more to the attractiveness of the diet than they do to its nutritive value. For instance, a New Jersey workingman's family in comfortable circumstances had a total expenditure of $34.95 for food during a certain

period. Of this, $5.16, or 14.8 per cent, was paid for oranges and celery, which together furnished only 150 grams protein and 6,445 calories of energy or about 1 per cent of both total protein and total fuel value. During the same period the expenditure for cheaper vegetables and fruits, such as potatoes, cabbages, sweet potatoes, apples, canned tomatoes, canned peaches, etc., was $5.75, and this funished 1,909 grams protein and 58,000 calories of energy. The expenditure of $5.16 for cereal foods and sugar furnished 3,375 grams protein and 184,185 calories of energy, or about 25 times the amount supplied by the celery and oranges. The oranges and the celery undoubtedly added to the attractiveness of the diet, and nothing can be said against their use, provided the cost of the diet is reasonable in proportion to the family income. It is true, however, that such foods could have been omitted from the diet without materially changing its nutritive value, while the cost of the daily food would have been considerably lowered; or other articles perhaps equally attractive but of lower cost might have been used in place of the oranges and celery.

It is in the combination, with due reference to economy, of staple articles, many of which are lacking in distinctive flavor, with foods and dishes which possess marked flavor that one of the greatest opportunities for skilful management in the household occurs.

Another problem of importance is the ease and economy of preparation of food in relation to its cost. A cheap cut of meat, like shoulder clod, cannot be so readily served in attractive form as a choice steak. The cheaper cut requires much longer cooking and consequently more fuel and labor, and to be at its best should be cooked with seasoning vegetables or prepared in some similar way which secures flavor. Other cases like this are too well known to need mention. True economy consists in so adjusting such matters to the family income that palate and purse may each have its due.

The housewife who can appreciate and apply the available knowledge regarding the relative cost of different methods of cookery, fitting combinations of food, the relation between composition and cost, and similar factors can supply wholesome diet suited to her family needs at a much more reasonable cost than is the case when such knowledge is disregarded.

The problems of economy in living differ in town and country. The farmer's wife has her vegetables, fruits, poultry, dairy products, etc., without a cash outlay, while the housewife in the city must purchase everything Considering market facilities, however, and the

prices which must be paid for many staple and fancy foods, the advantage with respect to such foods seems to lie with the careful buyer in the large town or city. The small town, with its garden and other opportunities for home production of food products, is, of course, midway between the city and country. Each region has its attractions and its special advantages, but the underlying principles with respect to economical home management are the same in every locality. It is with a view to helping the producer to provide the food supplies which are most needed and the housewife to solve her problems that studies of the kind and amount of food eaten, the relative nutritive value of different foods, the comparative economy of different methods of cooking, and related questions have been undertaken by this department.

B. The Relation of Public Consumption to the Farmer's Production

22. "CONSUMPTION OF MEAT ENCOURAGES AGRICULTURE"[1]

By ARTHUR YOUNG

Whatever a people principally consumes for their subsistence must be the great object of the husbandman in his culture: thus in France, where bread, I apprehend, forms nineteen parts in twenty of their food, corn, and especially wheat, is the only great object of cultivation, vines answering to our barley. In England, on the contrary, the quantity of meat, butter, and cheese consumed by all ranks of the people is immense—to a much greater value, I should suppose, than that of wheat; hence, cattle to our farmers is an object as important as corn. Thus the husbandmen in France keep scarcely any cattle, addicting themselves almost entirely to corn; in England vast quantities of cattle are kept. This circumstance, I should apprehend, would, if everything else was equal, give a prodigious superiority to the English agriculture.

Let us consider on what principles the farmers of the two countries must necessarily manage their lands. In England they keep such part of their farms in meadow and pasture as are by the nature of the soil so adapted; they throw their arable land into such courses of crops that several are introduced which are either summer or winter food for cattle. Under this system the quantity of dung raised is

[1] Adapted from *Political Arithmetic* (1774), pp. 158–61, 163.

very great, which being spread, as it usually is, on the arable fields, insures good crops—so much better than if such stocks of cattle were not kept that I question if three acres are not as productive as five would be.

Now let us turn to the Frenchmen: their two most general courses are, (1) Fallow, (2) Wheat, and (1) Fallow, (2) Wheat, (3) Barley or Oats. Wheat being in France the great object, all the expense is applied to that; a year's fallow is given, and what little dung they raise is all spread on it. The little demand for meat, butter, and cheese necessitates the farmer to apply all his land to corn—the consequences of which are he pursues a bad course of crops, the products are small, and profits comparatively nothing.

It must surely be evident to everyone that there is a great advantage to the English farmer from corn and cattle being in equal demand, since he is thereby enabled to apply all his lands to those productions only to which they are best adapted, and at the same time the one is constantly a means of increasing the product of the other. Nor is the advantage by any means confined to the husbandman: the state is intimately concerned. A much greater value is drawn from the earth; the farmer's profit is greater, consequently he is wealthier, and more able to work improvements and at the same time to pay his landlord a great rent: points of vast importance to the national interest.

23. UNWISE CONSUMPTION MEANS COSTLY PRODUCTION[1]

By S. N. PATTEN

If it takes fifteen bushels of wheat to make bread enough to last one man a year, and if an acre of land will raise only fifteen bushels, it is plain that if a man have only half an acre he must raise something else than wheat or go hungry. So long as a community having land of this kind live on wheat we could say with certainty just how many persons its land will support. There could only be as many men as there were acres of land. If, without substituting a more productive crop for wheat, they should use one-sixth of their land to raise tobacco, the number of people would be reduced by one-sixth. Should they now acquire a love for beer and use a second sixth of the land to raise

[1] Adapted from *Consumption of Wealth*, 2d ed., 1901, Publications of the University of Pennsylvania, Series in Political Economy and Public Law, No. 4, pp. 52–59.

barley and hops, there would be one-third less population than there was before these habits were formed.

The principle holds when other articles than wheat are produced. Upon an acre of land only so much rye, corn, or potatoes can be grown. And as the quantities of the crops are fixed by the kind of soil and the means of cultivation at hand, an acre of land under given conditions will support only so many people. In short, population increases with every change to more productive crops and is checked by a growing demand for rarer articles or useless luxuries.

In the earlier stages of civilization the land problem is usually the only vital question. It is true that even primitive men have wants which the products of the soil cannot gratify; yet these products so nearly satisfy all their desires that there is no conscious opposition between the interests of such men, except for the possession of land. If the population exceeds the number which can be supported upon a given area of land cultivated in a crude primitive fashion, there is no solution of the difficulty except by war, famine, or emigration.

With every increase of population there must be a modification of the desires of the people, through which their accustomed wants become less intense than some new wants which can be satisfied with a less demand for land. When a hunting tribe occupies a region, each individual must occupy many thousand acres to enable him to secure enough deer, buffalo, or game to supply his family. When the demand for food becomes changed from the wild to domestic animals, a quarter of the former space will afford room for the flocks and herds necessary to supply the same family. A crude cultivation of the soil can accompany another modification of the desires, which create a demand for cereal productions; and with this change comes another large reduction of the quantity of land which each family requires. Every subsequent change by which population and production have been increased has been following some change in the demand for food. The demand for some well-known article of diet has fallen off, or at least has been relatively reduced, and in its place some new article is substituted which allows a better use to be made of the land.

There is thus the most intimate relation between the desires of a people and their demand for land. Only as the desire for less expensive food grows can the opposition between the individual interests of different men be lessened. As we progress in civilization, we are obliged to adjust ourselves so that in our eating, drinking, and clothing we make less demand on land. Every family must occupy a smaller

space and modify their diet so that their demand for food can be satisfied upon the smaller tract to which they are now limited.

For this reason the laws of consumption are of prime importance in studying the direction along which the pressure of population forces the development of mankind. Those individuals or races who have an abnormal desire for the rare kinds of food must give way to their competitors, who can satisfy their appetites with articles of which nature grants a more abundant supply. Those families whose habits, tastes, or fancies cause them to reject a large portion of the food supply are surpassed by others who, through a better adjustment to the conditions of nature, have a love for all that variety which nature can provide. Strong appetites limit the diet to those articles which can best satisfy an intense desire for food. Weak appetites are so easily satiated with any one kind of food that many articles must form a part of the regular diet in order that enough may be eaten to meet the demands of the system. Families of weaker appetites are thus better adjusted to the conditions which increase production and create that variety in demand which allows the best use of all the land. As any tract of land can produce a variety of articles at less cost than it can the same quantity of some one or any few articles, the struggle for existence favors those who can get pleasure from all kinds of food more than those who have an intense desire for a few of the rarer kinds.

The facts which have been presented will, if properly correlated, furnish the key to the present misuse of land and the high price of food. Cheap men, who have inherited the strong appetites of their primitive ancestors, are yet so numerous that they create a large demand for land through their love of rare foods and stimulating drinks. The same causes retard the accumulation of capital, through which, alone, the inferior land can be changed into good land. As a result, a much larger area of land must be cultivated than would otherwise be necessary, and the higher price of food needed to cultivate so much inferior land without the use of the necessary capital takes a large part of the product of industry from the producers to go as rent to the owners of the better land. Dear food means a poor use of much land, while cheap food means a good use of a little land.

For this reason the public has the paramount interest in the use made of the land, and a right to restrain those forms of consumption which create a larger demand for land and destroy its fertility. The use of liquor and tobacco causes the land of whole states to be diverted from its best use, and its soil made valueless through the loss of its

productive elements. The mere waste of land is of less consequence than the diverting of other lands from their best use, and the scattering of the population over an immense area through which they are kept from enjoying the best fruits of modern civilization.

The interest of the public in the use of the land is already a well-recognized right. We would allow no one to shut up our rivers, or prevent the building of railroads, so as to keep the public out of the newer states. Nor are we willing that the cattle barons of the West should fence in large tracts of land for their especial advantage. There is, of course, a great need of beef; but the cheaper foods are of much more importance, and beef-raising must not stand in the way of a better use of the land. There is even much complaint because settlers are shut out of little Oklahoma, because the Indians do not cultivate the land. Yet if the Indians and cowboys are not allowed to exclude others who would make the land more useful to the public, the habits and instincts of the cruder portion of our population should not be permitted to waste a much larger portion of our country, and make the rest of it much less available for public and private uses.

The demand for land, which the diet of different persons in the nation creates, is of vital importance in determining which class will be displaced by the increase of population. Hunting tribes have no chance of success in opposition to those who graze cattle; and the latter are in turn easily expelled by the cultivators of the soil. And among the more civilized races, that class which makes the best use of the land has an advantage over all others. The family who need twenty acres to supply their wants cannot compete with a family who get their food from ten acres. The increase of population cuts down the number of acres which each family can have, and necessitates the use of more productive crops. The relative quantities of the rarer articles are thus reduced, while a greater variety in consumption is secured.

This fact will be the determining force in deciding the growing contest between the temperance and liquor parties in this country. The diet of abstainers creates a less demand for land than does that of those who have a love for liquor and tobacco. The latter class not only need twice the land that the same number of the former class does, but they also have double the temptation to spend their earnings foolishly. Abstainers will thus gradually acquire a larger share of the land and capital of this country and force the drinking class into the less favored occupations, where their rate of increase will be

reduced. There is no way in which the users of liquor and tobacco can hold their own, when their habits impose upon them so great an economic burden. The temperance people will increase in numbers and wealth until they are able to crowd out or suppress their opponents. Their advantage is as great as that of the power loom over the hand loom or of the railroad over the canal. Of the ultimate result of such a conflict there can be no doubt. The only question is whether drinkers shall be forced to reform or gradually be crushed beneath the weight of their growing disadvantage.

24. AGRICULTURE AND THE LIQUOR INDUSTRY[1]

Never before have brewers, maltsters, distillers, and wine-makers made so large a contribution to the agricultural prosperity of the country as during the fiscal year 1913. In the course of that year—the latest for which reliable statistics are available—grain and other farm products to the value of $113,513,971 were used in the manufacture of liquors, and this amount does not represent the value of the products so used as reported in the markets of Chicago, Cincinnati, Buffalo, Philadelphia, and other commercial centers, but the actual sum received by the growers, based upon the carefully compiled reports on farm prices issued from time to time by the United States Department of Agriculture.

The full significance of this amount, which represents, it may be stated, a return of 5 per cent on an investment of $2,270,279,420, can best be appreciated if we compare it with the reports of the last United States Census on the total values of the crops of certain typical states, which show that it exceeded the total combined crop values in the census year of Vermont, Maryland, and West Virginia; of Massachusetts, Rhode Island, New Jersey, and Florida; of Louisiana (with its great cotton and sugar interests), New Hampshire, and Utah, or of Maine, Connecticut, Delaware, Nevada, Arizona, New Mexico, and Wyoming. The figures for these states, as given in the Thirteenth United States Census (1910), Vol. V, p. 545, are as follows:

Vermont	$ 27,446,836	Louisiana	$ 77,336,143
West Virginia	40,374,776	Utah	18,484,615
Maryland	43,920,149	New Hampshire	15,976,175
Total	$111,741,761	Total	$111,796,933

[1] *Yearbook of the United States Brewers' Association*, 1914, pp. 265–67.

Massachusetts	$ 31,948,095	Maine	$ 39,317,647
Rhode Island	3,937,077	Connecticut	22,487,999
New Jersey	40,340,491	Delaware	9,121,809
Florida	36,141,894	Nevada	5,923,536
		Arizona	5,496,872
Total	$112,367,557	New Mexico	8,992,397
		Wyoming	10,022,961
		Total	$101,363,221

The $113,513,971 worth of farm products used in the production of distilled spirits and fermented liquors consisted of barley to the value of $55,236,641, corn $30,924,335, wheat $869,938, rice $7,288,786, hops $11,155,215, rye $4,604,476, molasses $2,056,626, fruit $751,835, and other agricultural products, primary and secondary, not included under the head of corn, $626,119.

The total farm value of the products used in the production of fermented liquors was $87,520,287, or 77.1 per cent of the total amount used for the production of alcoholic beverages of all kinds, and that of the products used in the production of distilled spirits, $25,993,684, or 22.9 per cent. Each barrel of beer yielded the farmer $133.98, being 79.58 cents for barley, 23.97 cents for corn, 1.33 cents for wheat, 11.16 cents for rice, 17.08 cents for hops, and 0.86 cent for other products. These amounts do not include transportation, commission, insurance, or, in the case of barley, the cost of malting, but, as already stated, are the net prices received by the growers.

COST OF FARM LABOR

The reports of the last United States Census (see Vol. V, pp. 560–64) show the amount expended for farm labor to have averaged 11.88 per cent of the total value of the crops produced. Applying this ratio to the $113,513,971 worth of farm products used by brewers and distillers in 1913, it will be seen that their production involved a total payment for farm labor amounting to $13,485,460, a sum sufficient for the employment of 74,919 persons for six months at an average wage of $30 per month.

THE MARKET AND THE FUTURE

Our complete figures show that there are three states (New York, Pennsylvania, and Illinois) in each of which between ten and twenty millions dollars' worth of farm products were used in the

production of distilled spirits and fermented liquors in 1913; five states (Ohio, Indiana, Kentucky, Wisconsin, and Missouri) in which the quantity so used represented a farm value of between five million and ten million dollars, and nine (Massachusetts, Connecticut, New Jersey, Maryland, Michigan, Minnesota, Louisiana, Washington, and California) in which it ranged from one million to five million dollars. While these states led all their sister-states in the use of grain and other farm products in the production of alcoholic liquors, not any of them were fully equal to supplying their own requirements. All of them, without exception, were dependent on other states for one or another of the materials used—in many cases for malt or malting barley, in others for rye, in nearly all for hops and rice.

There is, in fact, no state that does not share in the immense benefit accruing to the agricultural industry from the large annual consumption of farm products by brewers and distillers. A state may even have few or no breweries or distilleries within its own borders, and yet the annual value of its farm products is increased by reason of the never-failing requirements of the liquor industry as inevitably and unmistakably as it would be by the opening of a new market for one hundred and thirteen million dollars' worth of similar products.

What, then, it may well be asked, would be the effect upon the agricultural industry of the closing of this great and ever-growing market, a market that can always be relied upon for stability and uniformity? (The per capita consumption of both tea and coffee varies more widely from year to year than does that of spirits or fermented liquors. See Statistical Abstract of the United States, 1913, pp. 512, 516.) While the farm products used in the production of spirits and fermented liquors are of so diversified a character that, as already pointed out, the entire country shares in the benefit that comes from there being a constant market for between one hundred and ten and one hundred and twenty million dollars' worth annually, their production is at the same time so localized that its extinction would fall upon certain sections of the country with all the weight of a calamity. If one crop could be readily substituted for another, even in that case the economic disturbance that would result would be more or less serious. But it is only within comparatively narrow limits that such substitution can be made. Peculiarities of soil and

still more of climate determine where barley and hops and rice and sugar shall be grown, and not cotton or wheat or something else.

The American farmer is not wanting in resourcefulness, but it would not be without grave embarrassment and heavy financial loss that he would find himself deprived of a market for products that within the next two or three years will be worth, at the present rate of increase, $125,000,000 per annum.

NOTE.—Opponents of the liquor business have, of course, not failed to point out that there are other demands for the farmers' products which would fill the gap left by the forcible curtailment of brewers' and distillers' demand. The purchasing power of the public would not be reduced, but might even be increased, if changed habits of consumption brought greater bodily efficiency.—EDITOR.

25. CHANGES IN DIET

a) AWAY FROM MEAT[1]

BY J. RUSSELL SMITH

As population advances and increases, there is a tendency for us to change the nature of our food supply. In new countries we grow a crop, feed it to the animals, and then eat the animals and their products. As population increases, we tend more and more to eat the plant products ourselves. As this change comes, the tree crops advance more and more toward the exact filling of our needs. The physicians, the "cures," and the health-food faddists are more and more calling us away from meats and grains and high cookery to the diet of nuts and fruits. The table of food values shows that the nuts far outrank flour and even eggs and meat in protein, and that they also furnish fat and carbohydrates. To keep such highly concentrated food from doing injury, the fruits furnish the necessary bulk, succulence, and acids. In the Mediterranean countries the tree farmer with his olive orchard and its oil, has already given us tree-grown butter, which, by the way, keeps, while the more expensive animal product promptly spoils. Incidentally it is very significant that Italian olive oil is cheaper now in American cities than American butter is, and our olive industry has barely started. The nut-trees show us equally good substitutes for meat and bread, while the fruit-

[1] From *Harpers Magazine*, January, 1913, p. 280.

trees give us fruit. It is quite generally claimed by anatomists that the human digestive tract was made by and for a diet of fruit and nuts, which, therefore, are even now likely to be our most normal diet.

b) COTTONSEED MEAL AS HUMAN FOOD[1]

By G. S. FRAPS

The use of cottonseed meal as a human food was proposed several years back. For example, breads, etc., prepared from cottonseed meal were served to certain members of the Farmers' Congress held at College Station, Texas, some years ago.

The agitation for the use of this substance as a human food has recently been extended and has attracted considerable attention. Cottonseed breads and other edibles made from cottonseed meal have been placed upon the market at Brenham, Longview, and especially at Ennis, Texas. Mrs. Dan McCarty, of Ennis, Texas, claims to be the first and only purveyor of *cottonseed flour*, bread, and cakes, and her products have attracted considerable attention. Mr. J. W. Allison, who has been agitating this matter for some time, induced Mrs. McCarty to place this cottonseed flour bakery upon the market, and the experiment appears at present to be successful. The following products are being sold: cottonseed bread, cottonseed rolls, cottonseed steamed bread, cottonseed gingerbread, cottonseed ginger snaps, cottonseed doughnuts, cottonseed Jeff Davis plum pudding. Samples of certain of these goods, and also of the cottonseed flour, have been kindly furnished to us by Mr. Allison.

Cottonseed flour as made by Mr. Allison is cottonseed meal which has been specially treated, so as to remove the hulls as thoroughly as possible. It is also finely ground. Cottonseed flour should be free from hulls, of a bright yellow color, and with a pleasant odor and a sweetish taste.

The bakery products which we examined had a yellow or brown color, and a pleasant taste. They are, in all respects, entirely palatable. What was left after the samples were taken for analysis was eaten by the various members of the laboratory staff and by visitors.

The yellow or brown color is, of course, not noticeable in ginger snaps or gingerbread. The color cannot fail to attract attention to the lightbread, or steamed bread. This color may be considered

[1] Adapted from *Bulletin 128, Texas Agricultural Experiment Station*, pp. 5–14

objectionable by some. We do not believe, however, that attempts should be made to bleach the cottonseed meal. Bread made from cottonseed meal is different in nutritive value from ordinary bread, and it is well that the color should call attention to this fact.

Cottonseed meal could be used to replace meat in any diet, in the proportion of one ounce of cottonseed meal to two ounces of meat. The daily ration should not exceed two or three ounces.

Cottonseed meal could be used to increase the protein ration of those who are at present consuming quantities below the standard. The southern negro who lives upon fat meat and corn bread eats considerably less protein than is called for by Atwater's standards. The addition of cottonseed meal to his diet, at the rate of about two ounces a day, would improve his ration in this respect.

Negro families in Alabama eat only 62 grams protein per man per day, on an average, living largely upon fat meat and corn meal. Some consume as low as 16 to 24 grams protein per man per day. Atwater's standards call for 125 grams per day for moderate work. According to Chittenden, a low protein diet makes for muscular endurance. Cottonseed meal introduced into such diets as referred to above would increase the protein at a very moderate cost. It is to be hoped that attempts will be made to introduce it in such diets to some extent, in order that we may secure practical experience of its qualities and food values. A mixture of five parts corn meal to one part cottonseed meal could be used.

Other classes of people living on a low protein diet, according to Atwater's standards, are: poor families in New York, consuming 93 grams protein per man per day on an average; laborers in Pittsburgh, consuming 80 grams; Mexican families in New Mexico, 94 grams; Italian mechanics in Naples, average 76 grams.

There are other classes of laborers, particularly in foreign countries, whose daily ration is deficient in protein, according to our dietary standards. The addition of cottonseed meal to their daily ration would improve it in this respect.

Summary and Conclusion[1]

1. Cottonseed meal or flour contains about four times as much protein as eggs and three times as much as beef loin. Cottonseed meal food products made from one part cottonseed meal and four

[1] From *Bulletin 163, Texas Agricultural Experiment Station*, by J. B. Rather, pp. 25–26.

parts wheat flour contain from one-third less to one-third more protein than eggs, depending on the amount of water in the bread. Cottonseed meal is, therefore, a meat substitute and not a flour substitute.

2. Seven digestion experiments were made with men, three being with cottonseed meal, two with cottonseed flour, and two with meat.

3. The digestibility of the protein of cottonseed meal averaged 77.6 per cent and that of cottonseed meal-flour 78.4 per cent, as compared with 96.6 per cent for the protein of meat. The protein of cottonseed meal and that of cottonseed flour is equally digestible. It is eight-tenths as digestible as that of meat and nine-tenths as digestible as that of cereals, and equally as digestible as that of peas and beans.

4. The digestibility of the fat of cottonseed meal and flour appears to be very high. The fats are probably digested about 95 per cent and the carbohydrates about 68 per cent. The fat of meat was digested 99 per cent. The fat of cottonseed meal seems to be more completely digested than that of cereals, and practically the same as that of meat. The carbohydrates of cottonseed meal are about seven-tenths as digestible as that of cereals.

Cottonseed meal and flour contain twice as much digestible protein as beef flank, three times as much as eggs, and twice as much as mutton. Cottonseed food products made from one part cottonseed meal and four parts wheat flour contain from one-third to less than one-half more digestible protein than eggs. The digestible fat and carbohydrates of cottonseed meal, calculated as fat, are nearly equal in amount to that of beef flank, and more than equal to that of beef loin and mutton leg.

6. In these experiments the needs of the body for protein were met with a daily ration of approximately two ounces cottonseed meal or flour, one-half gallon milk, and eight ounces corn meal. If the milk were removed from this ration, about twice as much cottonseed meal and corn meal would have to be fed to maintain the protein in the bodies of the subjects.

7. A number of recipes for cottonseed food products are given. These foods were equally as palatable as similar ones made from corn meal or wheat flour.

In preparing cottonseed cakes or bread, use one part cottonseed meal or flour to four parts corn meal or wheat flour, and use the same recipes commonly used for wheat and corn bread and cakes.

8. A pound of digestible protein is twenty-one times as expensive in eggs, and fifteen times as expensive in meat, as it is in cottonseed meal.

9. One part of fresh, sweet meal, sifted free from hulls and lint, should be used mixed with at least four parts of corn meal or wheat flour. Diluted in this way few people will be able to eat more than two ounces of cottonseed meal daily. Cottonseed meal should not be eaten *in addition* to meat, unless it is known that too little meat is being eaten.

c) POTATOES IN PLACE OF BREAD[1]

If wheat remains at its present high figure or continues to rise in price, and if there is a corresponding increase in the price of bread, scientists in the department suggest that the ordinary household will find it advantageous to eat more potatoes and less bread. With potatoes at 60 cents a bushel, 10 cents' worth, or 10 pounds, will give the consumer a little more actual nourishment than two 1-pound loaves of bread at 5 cents each. The protein and fat are present in appreciably larger amounts in the bread, but the potatoes will be found to furnish more carbohydrates and more heat units.

Carbohydrates (starch) contribute greatly to the energy value of any diet, and since potatoes are rich in these, families that wish to expend their money to the best advantage are recommended to consider whether they cannot make a more extended use of them. They are easy to cook and when prepared in different ways can be made to lend variety to the winter diet when green vegetables are hard to obtain. Like other foods relatively rich in carbohydrates, however, potatoes should be eaten with foods correspondingly rich in protein, such as milk, meat, eggs, etc., and with foods like butter, cream, and meat fat to supply the fat that the body needs.

Under normal conditions in Europe and America the potato ranks next to bread as a carbohydrate food. If prices change sufficiently to make it desirable from a financial point of view, there is no scientific reason why potatoes should not be substituted to a great extent for bread. In addition the potato, like many fruits and vegetables, helps to neutralize an acid condition in the body. This is another reason for its being eaten in combination with meat, fish, and other animal foods.

[1]From *Weekly News Letter to Crop Correspondents*, March 10, 1915.

d) USE OF CHEAPER FOOD[1]

By G. F. WARREN

As our population is becoming larger we are being forced to use cheaper kinds of food. Beef is one of the most expensive foods because so much feed is required in order to produce a pound of it. It has been estimated that a given amount of grain will support five times as many persons as will the meat grown from it. As population increases, the price of grain rises faster than does the price of meat. During the last ten years corn has risen in price much faster than have steers. This is the reason why farmers are not raising more beef. The childish suggestion that each farmer should raise two steers a year would result in a very much higher cost of living if farmers were foolish enough to follow the advice. This advice ignores the fact that we cannot eat the grain and also produce beef from it. Laws are often introduced in Congress and in state legislatures to prohibit the killing of heifer calves, in the apparent assumption that calves live on air. The food in the milk that it takes to produce a given amount of veal will support more persons than will the veal. The longer the calf is fed on milk the less is the supply of human food. The comparative prices offered for the milk and for the veal produced from it are measures of the comparative need of the city for these products. Hence, calves are not kept long except where milk is cheap. Few cattle are raised except where feed is cheap.

A given amount of feed will produce much more human food in milk than it will in beef. Dairy cows are therefore increasing about as rapidly as population. We keep a little more than one cow for five persons. In addition to milk, this number of cows provides about one veal or one old cow or bull for beef for each family each year.

Hogs are much more efficient users of food than are steers. A given amount of grain will produce many more pounds of pork than it will of beef. For this reason hogs are increasing in number while beef cattle are decreasing.

Poultry are very efficient users of food. As meat rises in price, more eggs are used. From 1890 to 1910 the population of New York, Chicago, Boston, St. Louis, Cincinnati, San Francisco, and Milwaukee increased 78 per cent whereas the receipts of eggs increased 183 per cent.

When population becomes very dense, roughage and waste products be used will for producing milk and we shall raise only as many beef cattle as can be kept on the remaining supply of roughage and pasture.

[1] From *Bulletin 341, Cornell Experiment Station*, pp. 202-3.

26. MODIFYING THE CONSUMER'S DEMANDS

a) STIMULATING THE CONSUMPTION OF CITRUS FRUITS[1]

The Most Useful Fruit

Here are some facts about lemons that all housewives don't know, and they mean a great deal to your family. In your own interest, don't pass this page until you learn what they are. * * * * * *

Lemons are used in hundreds of thousands of homes in four times as many ways as you probably use them. That's because hundreds of thousands of housewives have found out through experience about their household convenience and healthfulness.

They use lemon juice almost entirely in place of vinegar, as most famous chefs do today. They insert two halves of lemons in fish and bake them *with* the fish to get a delicious flavor.

They use lemon juice to flavor innumerable other foods. And the lemon flavor predominates in homemade sweets.

Try using *more* lemons in the 86 ways explained in the Sunkist Lemon Book. See what you can do with lemons in *your* home to make the household work easier and to better the family's health.

Sunkist

The World's Best Lemons

GROWN IN AMERICA

The World's finest lemons—Sunkist—are grown in California—the more reason why American housewives should use them to the utmost of their possibilities.

For Sunkist are picked by gloved hands under sanitary conditions, washed by machinery, and sent to your dealer, tissue wrapped. Thus you get them *clean.*

They are practically seedless, firm, juicy, and full flavored, with a beautiful color and bright, waxy appearance—no finer lemons were ever grown. So see that you get SUNKIST

OTHER USES

Sunkist Lemons or their juice can be used also—

To make tough meats tender.

As a liver tonic, diluted with water.

As a mouth wash, slightly diluted.

As a cleansing agent, for hands and face.

As a tonic for the scalp, in a shampoo.

For the complexion.

In the bath.

To soften water. To make clothes-washing easier.

To remove stains.

To clean silver, brass and glassware.

Complete directions for these uses and scores of others are given in our free lemon book. Just send a postcard for it.

Recipe for Sunkist Lemon Pie

Mix one and one-fourth cups of sugar thoroughly with one-third of a cup of flour and a little salt. Grate a little of the rind from a Sunkist Lemon and mix with the juice of the whole lemon and add to the sugar. Beat three egg yolks well, stir in a scant cup of water and blend carefully with the sugar and lemon mixture. Pour all into a pan lined with flaky pie-crust (preferably a pan that is perforated or made of wire), add a tablespoon of butter cut into bits, and bake in moderately hot oven.

Make a meringue of three egg whites and half a cup of powdered sugar, with a teaspoon of lemon juice. Heap onto the pie (after baking) in large spoonfuls and brown slowly. Serve when cooled.

Save Sunkist tissue wrappers for beautiful silver premiums
Ask for the Premium List and directions.

Foods Made Delicious With Lemons

Be sure to send for our free recipe book and try the delicious dishes described: pies; ices, cakes, cookies, puddings, jellies, beverages, candies, etc This book will surprise you —you'll regard lemons as indispensable when you know the many ways to employ them.

California Fruit Growers Exchange

CO-OPERATIVE—NON-PROFIT

Try these incomparable Orange Recipes. We will send "Sunkist Salads and Desserts," a beautiful *New* Book—Just Out—to every housewife who mails this coupon

The book is printed in full colors and describes many delightful ways to serve Sunkist Seedless Navel Oranges. The recipes were created, tested and tried by Helen Armstrong, the famous domestic science expert. Dishes even one-half so dainty and delicious are suggested in no other book of recipes that we know.

Here are *new* things—new uses for oranges—that you probably have never tried. Charming salads and enticing desserts that the entire family will enjoy. All are inexpensive. All are easy to make.

[1] Clipped from current magazines.

Selection 26a) Continued

"Owing to the phenomenal growth of the citrus industry," continued Mr. Chase, "we must create a larger market for our fruit, especially grapefruit, and we look to the transportation companies to help us do it. There are thousands of acres of land in Florida good only for grapefruit. If growers are unable to sell their products, this land probably will be valueless. I believe the transportation companies should cut their rates to the smallest possible profitable margin so that we shall be able to put our fruit within the reach of the poor man. We cannot expect to get rich by selling to the wealthy class, and if the Florida grower makes money we must be able to send our fruit to the markets and be able to sell it at a lower figure in order that we may create a larger demand and also to dispose of all that is raised. I predict that within five years the state of Florida will be shipping 14,000,000 boxes of grapefruit alone, and it is because of this increase that we advocate a reduction of freight rates and a broadening of the markets."

b) PUBLICITY FOR THE PEACH[1]

TO THE PEACH GROWERS OF THE UNITED STATES

The real test of your business ability is at hand.

If you were a manufacturer of an automobile, patent suspender button, breakfast food, or any other thing that you wanted to sell to the public, you would be rated as mentally incompetent if you did not let the consuming public know what you have.

And you would let them know through a well-planned, scientific advertising campaign.

But here you are, with one of the biggest peach crops in the history of the United States hanging on your trees, your investment of millions of dollars in orchard property waiting for a reasonable dividend, and not a thing has been done to tell the American public that peaches are on the bargain counter.

The thing to do is for every peach growers' organization. every large shipper—in fact every factor interested in the production and marketing of peaches—to authorize his sales agent to deduct 1 cent per package from the proceeds of each car, the said 1 cent per package to be sent to a central committee, chosen by large fruit growers' organizations, and this fund judiciously expended, under the counsel of such a committee, in advertising peaches.

[1] Both these readings are from *The Packer*, a prominent weekly newspaper of the produce trade. The first is an advertisement of a large selling agency, July 23, 1915; the other a news story of September 3, 1915.

Not YOUR peaches, or MY peaches, or ANY INDIVIDUAL BRAND of peaches, but "PEACHES." Let the housewives of the United States know that never before has such an opportunity existed to buy at a low price the most superb quality and grade of fruit. Peaches for breakfast, peaches for dinner, peaches for supper. Peaches canned, peaches preserved, peaches brandied, peaches pickled.

It is astounding what a comparatively small amount of money, judiciously expended, in the big city dailies, street car cards, billboards, and other media will do.

This is not an advertising talk. I hold no brief for the newspapers, for the street cars, or any other advertising proposition, but I do hold a very deep interest in the welfare of the peach industry; and that there is a probable crisis at hand, every well-informed fruit man knows. ONE CENT, spent in the right direction to increase the consuming demand, will return to the grower FIVE, TEN, or TWENTY cents in cold cash, through better returns.

It is not the main crop that breaks the market, it is the surplus above normal requirements. An advertising campaign of reasonable proportions would stimulate sufficient increased demand to take care of that surplus that breaks the market, and sustain the whole market on a fair price level.

There are plenty of good peach salesmen, whether they be commission merchants, fruit distributors, or brokers, it matters not. This is no recommendation that you use any particular sales channel. Use whatever connection you have found to be satisfactory in the past. This presentation of facts has nothing to do with the marketing problem, other than to center the attention of the peach producers throughout the country on the fact that they are overlooking one of the most vital necessities in their business. It has a bearing not only on this year's crop but on every crop.

Am I right or am I wrong? I should like to have an expression by wire and mail from every progressive fruit producer or shipper who is interested in taking up this matter for definite and immediate action. This movement should be non-partisan, and should recognize every legitimate factor in the business. All should pull together. Every large consuming center should be developed to its maximum consuming capacity, to take care of the crops of peaches now hanging on the trees in Michigan, New York state, Ohio, Virginia, West Virginia, Maryland, New Jersey, Connecticut, Arkansas, Missouri, Colorado, and the West.

PUSHING PEACHES

Week of September 13 May Be Declared as "Peach Week"

New York, September 3, 1915.—The Peach Growers' Publicity League, which organization came into being a few weeks ago for the purpose of disseminating information on the peach crop so that the consumer would know that there are plenty of peaches, at reasonable prices, to be eaten, canned, and preserved, is making much headway.

There is a movement on foot now to try to get the Office of Markets to endorse the third week of September as "peach week." This department of the government has entered into the work of advertising peaches with commendable vim. Late last week the department issued something like 30,000 circulars to retailers of fruits and vegetables throughout the eastern and middle-western states. The circular stated that there were 5,598,000 bushels of peaches more this year than there were last and pointed out the fact that peaches were grown to eat, and, among other things, handed out this advice:

Move peaches fast! Start your campaign immediately!

Use peaches as "leaders," handling large quantities of them on a small margin. This attracts the housewife, results in quick sales, reduces loss through decay, and increases your profits.

In every practicable way encourage your trade to buy in the original package for canning. Display crates and bushels in your store so that both the color and the price will be appealing. Every peach canned means more sugar sold, and when the fruit is disposed of in the original package it is easily and quickly handled with little waste.

Advertise peaches. Herald the big crop and the low prices. Urge your customers to can enough for two seasons. Insist on good stock from your wholesaler. There is plenty of it.

The press-agent department of the campaign is in the hands of Mrs. Julian Heath, the president of the National Housewives' League. Mrs. Heath has a great reputation as a press agent, so much so that the daily papers are hardly passing an issue without something about what the Housewives' League is doing to push the consumption of peaches. The league is said to have 800,000 members and Mrs. Heath is advising all the members to can their peaches now.

The Peach Growers' Publicity League is getting out the advertising matter in the form of placards and circulars. It has disposed of thousands of big pasteboard signs. Bunches of this literature have gone out to growers in the country with instructions to ship them back to their commission merchants with their [continued on p. 112]

c) A RAISIN "AD"

A NATION OF CHILDREN

Want Raisin Bread *Like This*

Bread filled with big, meaty, *tender* raisins, with all the seeds extracted—raisins containing that pure fruit-sugar that all children crave and *need.*

Bread that is a grain-food plus *fruit*-food, the tastiest, most healthful food they know.

Bread that is digestible, mildly laxative, and of which they can eat their fill.

You can *get* such raisin bread now at your dealer's. No need to bake at home.

It contains luscious, *Sun-Maid Raisins,* the finest raisins California grows. Perfect in flavor. Rich in food value. Being concentrated nutriment, it is one of the cheapest foods you can serve. It adds delicious variety at a trifling cost to otherwise plain meals.

We have arranged with thousands of bakers to use Sun-Maid Raisins in a special raisin bread, baked after a prize recipe which we furnish.

You can probably get it from *your* baker, with the label which marks the genuine California Raisin Bread made with Sun-Maid Raisins.

Serve it and see how they like it—hear them ask for it at every meal. Such bread as this will solve the appetite problem of many a poorly nourished child.

Why let any child go without it?

California Raisin Bread

MADE WITH SUN-MAID RAISINS

Is Sold by your Baker or Grocer

If he hasn't it send us his name and address. He'll be glad to supply you when he knows Sun-Maid quality

1 Lb. of Raisins Contains More Calories of Food Value Than a Pound of Sirloin Steak

One pound of raisins contains 1,635 energy units. One pound of steak contains 1,530. Eggs, considered the standard of food value, pound for pound produce only one-half the energy.

Write for beautiful book showing 179 ways to use Sun-Maid Raisins—in cereals, sandwiches, salads, pies, puddings, cookies, cakes, sweetmeats, and frozen desserts.

We'll send this book FREE in reply to a postcard bearing your grocer's name and address. Send for it now, and learn how raisins can cut down vour living cost.

Sun-Maid Brand for Home Use

Sun-Maid Raisins are made from choice California *white* grapes—kinds too delicate to ship. We select them from the cream of the crop and *sun-cure* them in the open vineyards.

They taste like confections, yet they cost no more than common raisins do.

Three varieties: Seeded (seeds extracted), Seedless (made from seedless grapes), Cluster (on stems, not seeded). One-pound packages.

Ask your dealer today for a package. See how good these raisins are.

CALIFORNIA ASSOCIATED RAISIN CO.

915 Madison St., Fresno, California

Membership, 6,000 Growers

Raisins are Nature's Candy—GOOD for Little Folks

consignments of peaches. The Housewives' League is distributing its share among the retail dealers and the Office of Markets is also putting out these signs.

The National Housewives' League has instituted daily demonstrations on how to can peaches. This was quite well advertised locally and the housewives appeared at the headquarters of the league in crowds this week for the purpose of learning the various ways of canning and preserving the fruit. Demonstrations are made by an expert in the employ of the Department of Agriculture.

The Peoples Market, a new place in the Bronx, opened this week, gave the Housewives' League free space in which to sell peaches to the consumer. [*Selection* 26*c*) *on p.* 111.]

27. RESULTS AND LIMITATIONS OF SUCH EFFORT

a) INDICATIONS OF INCREASED CONSUMPTION[1]

FRESNO, CAL., September 3, 1915.—Coast advices are to the effect that the shipments of raisins to consuming centers at this time are unprecedentedly heavy for the season. The fact that more raisins are being shipped and consumed this year than ever before, even though prices are on a reasonable basis and higher than they have been at some times in the past, quite conclusively proves that consumers are beginning to realize the particular food value of raisins, and their pleasing flavor as well.

During the past year hundreds of new ways for the use of raisins have been published. The effect of this has been to give the increased consumption of raisins which is now so evident. The use of raisins is, after all, largely a matter of education. There is probably no article of food which is so universally relished as raisins. This being the case, all that is necessary to gain a very large consumption is to educate the user to the many ways that can be used conveniently.

The California Associated Raisin Company has very recently announced its advertising campaign for 1915. This campaign is very largely one of education, more than one of selling.

Some years ago the Grecian government instituted an advertising campaign for the purpose of increasing the consumption of raisins and of currents. This advertising was immediately successful, just as has been the case with the California advertising, and the annual per capita consumption of this class of food in England was increased to

[1] From *The Packer*.

five and one-half pounds. There would seem to be no reason why the American consumption should not be as great, excepting that the supply would not permit of this.

FRESNO, CAL., October 1, 1915.—Reports generally are that the raisin-advertising propaganda is producing remarkable results. The bakers are taking hold of the raisin-bread idea generally, as it seems to offer an opportunity for larger profits than is the case with plain bread, and the consumer demand for it develops almost without effort. Likewise a very large demand is building up for the Sun-Maid brand package of seeded raisins, as a result of this extensive advertising plan, all of which merely proves that in modern business there is no force as powerful as advertising.

CHICAGO, October 22, 1915.—National Apple Day was celebrated here Tuesday and the trade made a big showing. One of the features used in advertising was a parade in which a string of wagons, contributed by South Water Street merchants, passed through the crowded loop district loaded up with a supply of Jonathan apples, which later were given to inmates of hospitals, orphanages, old people's homes, and schools.

The carload of fruit, which was donated for the occasion by the American Apple Association, contained several hundred thousand apples. The parade consisted of twenty-five wagons. The horses were decorated with crimson ribbons and pennants which were lettered with Apple Day mottoes. On the sides and over each wagon were placards informing the thousands who packed the streets that "Health's Best Way" was to "Eat Apples Every Day."

Chicagoans showed more genuine interest in aiding apple dealers in their effort to popularize the fruit and help in the disposition of this year's crop than was primarily expected by promoters of the day and parade here. Richard J. Coyne, who was chairman of the apple publicity committee, and who did most of the work to make the day a success, stated that it proved a success far beyond his expectations. He said that he distributed more than 25,000 red Apple Day badges and everybody who got them wore them.

Thousands of boxes and barrels, mainly for eating purposes, were on sale at prevailing prices and buyers purchased freely late last week and Monday. The Apple Day boom here created a special demand, which was shown by the fact that all hotels and cafés bought large quantities and served them in all styles—and everybody ate apples in one form or another.

Los Angeles, Cal., May 13, 1916.—G. Harold Powell, general manager of the California Fruit Growers' Exchange, recently returned from an eastern trip and reports general conditions for the orange interests of California the best they have been for years. Mr. Powell believes that new outlets have opened up for the distribution of California oranges and lemons, and that the demand is increasing because of the quality of the fruit. He is also quite optimistic in regard to the lemon situation.

b) REACHING THE LIMIT[1]

PEACH WEEK AT CHICAGO

Fruit Advertised and Special Prices Established—Demand Increased

Chicago, August 13, 1915.—Peach week was celebrated here this week. Special prices, attractive placards, and publicity in the daily papers were featured among the activities of those behind the campaign. Mayor Thompson issued an official proclamation declaring this to be peach week, and urging the co-operation of the public.

A special price to the consumer of $1.50 per bushel was made and was posted on all the placards and displayed in the retail stores. Arrangements were made along South Water Street to sell the grocers at $1.25 per bushel. Housewives were urged to take advantage of the heavy movement at the present time and save money through buying by the bushel.

Dealers along the street declared that the publicity undoubtedly aided the demand a great deal, and said that an increase was felt in the inquiry for peaches. A good many of them, however, claimed that grocers took advantage of the fact that a special price had been set and made an effort to buy at lower than $1.25, some of them forcing the price down as low as $1 on good fruit. In a general way, however, the idea proved a help to the situation and gave peaches a lot of advertising that should result in an increased use of the fruit from now on.

CHICAGO HAS PEACH GLUT

Chicago, September 17, 1915.—Peach dealers found it rather difficult to clean up every day this week owing to the fact that the market was overstocked with all varieties of peaches. Prices were very low and dealers asserted that this condition this year was brought

[1] From *The Packer*.

about because of the early heavy southern peach crop. Thousands of persons here canned the southern goods instead of waiting for the arrival of the later Michigan crop.

"It hasn't been the heavy receipts that kept down prices, but it is obvious to me that the people have been peached to death," one prominent handler declared. It was evident at this market that everybody had become tired of peaches, and only stock of the finest quality had any demand.

C. The Administration of Farm Income

28. SOME ITEMS OF THE FARMER'S LIVING[1]

By W. C. FUNK

It is what the farm furnishes directly toward the living expenses of his family which enables the farmer to get along, even though his crops are poor or the loss on his live stock eats up his profits. Food and shelter are the important requisites of life, and a good proportion of these necessaries are furnished by the farm in addition to the income derived from the sale of farm products. The labor income is therefore not the limiting factor in determining how much the farmer shall have to eat, but it is of the wage-earner in the city.

The three important elements furnished by the farm for the family are food, fuel, and the use of a dwelling. Food is the most important of these. Of the total value of products and privileges furnished by the farm, food equals 62 per cent; house, 30 per cent; and fuel, 8 per cent.

In the southern states the values of food products furnished by the farm are appreciably higher than in the northern states, owing to the long growing season for vegetables and to more meat being furnished by the farm for home consumption.

In the southern states less fuel is needed than in the other states. In the Texas area the farm furnished only a small portion of the fuel used, most of the farmers buying both wood and coal.

In Table I the average values per family of food, fuel, and use of house are shown by states. The general average of these items furnished by the farm per family is $421.17. This amount represents a very valuable contribution of the farm toward the farmer's living, and in many cases is no doubt greater than the labor income received

[1] Adapted from *Farmers' Bulletin 635*, pp. 1–9.

from the farm. It should be remembered that these same products and privileges would cost considerably more in a city.

TABLE I

AVERAGE ANNUAL VALUE OF THE FOOD, FUEL, AND USE OF A DWELLING FURNISHED BY THE HOME FARM TO 483 FAMILIES IN 10 REPRESENTATIVE AGRICULTURAL DISTRICTS

STATE	NUMBER OF FAMILIES	PERSONS IN FAMILY	FOOD		FUEL		HOUSE RENT		TOTAL	
			Per Family	Per Person	Per Family	Per Person	Per Family	Per Person	Per Family	Per Person
North Carolina	55	4.5	$330.65	$ 73.47	$ 41.87	$ 9.30	$ 56.00	$ 12.45	$428.52	$ 95.22
Georgia	50	5.4	376.03	69.65	51.60	9.56	92.00	17.04	519.63	96.25
Texas	44	5.3	275.62	52.00	4.13	0.78	83.00	15.66	362.75	68.44
Kansas	46	4.5	292.48	65.00	17.97	4.00	116.00	25.80	426.45	94.80
Iowa	51	4.4	297.28	70.80	30.20	7.20	158.00	37.62	485.48	115.62
Wisconsin	46	4.2	209.44	47.60	35.80	8.14	130.00	29.54	375.24	85.28
Ohio	44	4.1	248.28	60.57	30.50	7.44	172.00	42.00	450.78	110.01
Pennsylvania	43	5.2	201.69	38.80	17.91	3.44	163.00	31.34	382.60	73.58
New York	55	4.0	189.60	47.40	53.80	13.45	188.00	47.00	431.40	107.85
Vermont	49	4.8	192.43	40.10	63.40	13.21	93.00	19.38	348.83	72.69
Total or average	483	4.6	$261.35	$ 56.54	$ 34.72	$ 7.65	$125.10	$ 27.78	$421.17	$ 91.97

It is not possible, for want of certain data, to show what relation the house rent, food products, and fuel furnished by the farm bear to the income received by the farmer. It is interesting, however, to note what proportion of the necessary living expenses is furnished by the farm as free goods and what proportion has to be bought.

Table II shows the relative amount of food, fuel, light, and shelter furnished by the farm. It will be noted that the value of the articles

TABLE II

AVERAGE ANNUAL VALUE OF THE FOOD, FUEL, AND OIL BOUGHT BY THE 483 FAMILIES INCLUDED IN TABLE I

STATE	NUMBER OF FAMILIES	PERSONS IN FAMILY	FOOD		COAL		WOOD		OIL		TOTAL	
			Per Family	Per Person	Per Family	Per Person	Per Family	Per Person	Per Family	Per Person	Per Family	Per Person
North Carolina	55	4.5	$ 71.28	$15.85			$ 1.71	$ 0.38	$ 3.10	$ 0.69	$ 76.09	$16.92
Georgia	50	5.4	104.42	19.32					5.18	0.96	109.60	20.28
Texas	44	5.3	213.47	40.30	$17.35	$ 3.27	15.17	2.86	7.58	1.43	253.57	47.86
Kansas	46	4.5	157.41	34.97	12.70	2.82	0.33	0.07	7.21	1.60	177.65	39.46
Iowa	51	4.4	146.43	34.87	29.57	7.04			6.92	1.65	182.92	43.56
Wisconsin	46	4.2	143.25	32.56	20.70	4.70	3.00	0.68	5.78	1.31	172.73	39.25
Ohio	44	4.1	124.98	30.50	23.70	5.78	2.00	0.49	4.88	1.19	155.56	37.96
Pennsylvania	43	5.2	190.32	36.60	26.90	5.17	1.09	0.21	6.37	1.21	224.68	43.19
New York	55	4.0	186.71	46.68	16.00	4.00	1.00	0.25	5.79	1.45	209.50	52.38
Vermont	49	4.8	169.17	35.24	1.01	0.21	2.00	0.42	4.61	0.96	176.79	36.83
Total or average	483	4.6	$150.75	$32.69	$14.79	$ 3.30	$ 2.63	$ 0.54	$ 5.74	$ 1.24	$173.91	$37.77

bought by farmers in North Carolina and Georgia is very low, being approximately only one-half as much as the average for all the states. In Texas the value of these purchases is high, owing to the fact that the section visited is quite dry at intervals during the summer and that therefore less vegetables and fruits are raised. A large percentage of the wood used for fuel in Texas is also bought.

Of the products bought, mentioned in Table II, 86 per cent is food; 8 per cent, coal; 1.5 per cent, wood; and 4.5 per cent, oil. The total value of these is $173.91 for a family of 4.6 persons. It can thus be seen that if an attempt were made to reduce this annual cost or expenditure, the first effort should be to raise more food products.

29. CRITICISM OF PRESENT CONDITIONS ON THE FARM[1]

"In many homes life on the farm is a somewhat one-sided affair. Many times the spare money above living expenses is expended on costly machinery and farm implements to make the farmer's work lighter; on more land where there is already a sufficiency; on expensive horses and cattle and new outbuildings, while little or nothing is done for home improvement and no provision made for the comfort and convenience of the women of the family." "If a silo will help to reduce the man's labor, a vacuum cleaner will do likewise for his wife. If the stock at the barn needs a good water system to help them grow, the stock in the house needs it too, and needs it warm for baths." "You see many a farm where there is a cement floor in the barn, to which the farmer will point with pride—the cellar in the house awful. A sheep dip, but no bathtub; a fine buggy and a poor baby carriage. On many farms a hundred dollars in cash are not spent in the home in a year."

"Teach the men that we need the new improvements in our homes as much as they in their fields. So many of us are cooking on the same old stoves we first began housekeeping with; still rub our clothes on the washboard on wash day; use the same homemade tables, benches, and beds we have always had to keep house with. The men around us have bought automobiles, mowers, rakes, hay racks, and new patent stackers, sulky plows and harrows, cultivators and wagons, and in fact whenever they see something that will lighten their labors

[1] Excerpts from the letters received by the Department of Agriculture in response to letters of inquiry concerning the needs of farm women, published in *Reports No. 104* and *No. 106*, Office of the Secretary.

they immediately write a check and lo! it is theirs. A great many of these things our men buy are used but a short time during each year, but give the women ranges, kitchen cabinets, linoleum-covered or hardwood floors, sanitary walls and wall covering, washing machines, iron bedsteads, good water, and things of use and a comfort to every member of the family every day in the year, and very few of the things are any more expensive than the price of a sulky plow. Our reasons for asking these things are that we believe that with better homes there will be less divorces from the farming districts; our boys will like their homes better and continue on the farm; and our daughters will not be so anxious to work in the city and will not say, 'Any kind of a man but a farmer, and anything but a farmer's wife and the same old things that mother puts up with.'"

"Ignorance of value of foods is evidenced by the unhealthy and puny children of many farming districts. Farm women should be taught how to economize time and strength in performing their household duties, how to prepare simple, nutritious meals, well cooked and as well 'balanced' as the 'rations' the farmer is taught to feed his stock." "It is like the old saying, 'A woman can throw more out of the window with a spoon than a man can bring in with a sack.' Only 1 per cent of the left-over food is ever used. The laboring class of whites (in Georgia) use two and one-half times more food-stuff than the negroes of the South and have one-half less to eat, for the negroes generally prepare their food in good shape with great saving to themselves." "Some form of indigestion and the resulting physical disorders are universal. Much of their earnings goes for doctors' bills or patent medicines, when intelligent and correct housekeeping would remedy it all."

30. POOR STANDARDS OF CONSUMPTION AS RELATED TO HOUSING[1]

By HARVEY B. BASHORE

When we first began to investigate this subject, it was hard to believe that real overcrowding existed in the country districts, but the more the subject was studied the more the fact became apparent. For example, a nurse from one of the state dispensaries, in her visiting work, came across a certain farmhouse where five people were accustomed to sleep in one not very large bedroom, which had only one

[1] Adapted from *Overcrowding and Defective Housing in the Rural Districts*, pp. 35–92. (Published by John Wiley & Sons.)

small window, and even that was nailed shut; one of these five had incipient tuberculosis. These people were well-to-do farmers, living in a large twelve-room stone house, and simply crowded into one room for the sake of mistaken economy—presumably to save coal and wood. This house is a very comfortable and airy building which would be entirely suitable for an even larger family to live in, under proper sanitary conditions.

Another form of this overcrowding is seen in certain mountain districts of Pennsylvania, and I suppose it may be very much the same in other states. It has been noted in these places that the natives do not have the strong, healthy build, and a color redolent of health, but the thin, pale, and wan features of those suffering from the lack of pure air. Yet these people live in the purest of God's fresh air, in places akin to those in which we build our sanatoria. Why is it? In many instances the explanation seems to be dependent on the personal habits of these mountaineers, who, on the advent of winter, "hole up," a good deal like certain animals. They lay in a supply of wood, but as wood is becoming scarce and they are generally lazy and shiftless the supply is not overabundant, so they economize space and heat, and have fire only in the cookstove in the kitchen. Windows and unnecessary doors are nailed shut, and here around the stove the family spend most of the winter, eat and sleep in one, or at the most two, rooms: and the result? The faces you see here in these mountain homes remind you of the faces you see in the densely crowded insanitary tenements of the cities. The complete outdoor life of summer is barely able to combat the bad air and lack of air during the winter months, and a chronic condition of lowered vitality results.

In one of these mountain homes—a typical one—a bedroom, which is the loft with a floor surface fifteen feet square, is habitually used by eight people. Three sleep in one bed, two in another, two more in still another, and the mother, who is tubercular, sleeps on the cot in the corner. One would hardly believe it possible that such overcrowding exists, yet there are many cases like this among these mountain people. When I remonstrated with the owner, who is well known to me, about his insanitary living, he admitted that conditions were bad and that he had hoped to build an addition to his house, but he was short of funds. I knew he was telling the truth, and as I was not anxious to help him negotiate a loan, I found it profitable to change the subject; loaning money to such does not overcome the defect, or if it did, it would certainly be temporary.

A similar example of this overcrowding is shown in another mountain home. This small shack—one could hardly call it a house—contains seven people. The building is composed of four rooms—kitchen, sitting-room, and two bedrooms, one of which is used by four people and the other by three. The rooms are so diminutive and the windows so small that, although these people live right on the foothills of a wild mountain country, they are living under very badly overcrowded conditions and are paying the penalty—tuberculosis.

The worst case of overcrowding, however, that I have ever seen appeared one day last summer when I prepared to administer immunizing doses of antitoxin to an Italian family during an epidemic of diphtheria. Thirteen children lined up to take their "medicine"; in addition, there were six adults, making nineteen human beings living in one house, and this house containing only six rooms. Where these people slept was almost a mystery, for there were but three beds in the house. They simply stretched out on the floor; and their pale and sallow faces told the cost—the great cost—of overcrowding. You might think this was a Hester Street tenement, but it happened to be a farmhouse, situated in one of the most beautiful valleys of southern Pennsylvania, far from the smoke and din of cities. The old idea that the country is such a healthful place to live in is good only so far as the country is fresh from the hand of the Lord, for man's make-over in the country is generally poor—very poor.

While the home life is vastly more important than the school life, and though the sanitary arrangements of the surrounding farmhouses are usually vastly worse than the neighboring schools, yet it is quite likely that the country school—overcrowded and with glaring sanitary faults—is an item in the rural health. The little one-room schoolhouse, so common all over the country, has turned out some great and good men, and women too, but it has also turned out many that might have gotten along better in the world if their physical condition and welfare had been looked after: it is a good thing to remember that real progress is not the progress of the few great men, but the standard and average of the plain, ordinary citizen.

The air-space per pupil should be between 250 and 500 cubic feet, depending on the means of ventilation: if there is no special arrangement for the admission of fresh air, the greater air-space—500 cubic feet—will surely not be too much. In an ordinary country school—overcrowded, of course—I have seen the air-space as small as 100 cubic feet per pupil, which is, without question, entirely too low.

What is the result of this overcrowding and lack of proper housing in the country? Just exactly the same as in the great cities—lack of efficiency, disease, and premature death to many. We have been talking much lately of our conservative policy of lumber, coal, and wild animals, but in many instances fail to see the great loss due to human inefficiency brought about by lack of suitable environment. While the great majority of people subjected to overcrowding and bad housing conditions do not prematurely die, yet they have a lessened physical and mental vigor, are less able to do properly their daily work, and not only become a loss to themselves and their families, but to the state; and forever stand on the threshold of that dread disease—tuberculosis; for tuberculosis is the one great disease of the overcrowded.

Just how much tuberculosis we have in the rural districts in proportion to the great cities is pretty hard to say, but everyone who has investigated it is positive in the opinion that there is just as much in the country districts; indeed, some report more in the country than in the adjoining cities. We find it in farmhouse and the mountain home—habits of carelessness possibly keep up the infection. We do not have "lung blocks," like the large cities, but we do have "lung houses" where case after case of tuberculosis has lived and perhaps developed.

The Wisconsin Antituberculosis League, a year or so ago, made a very careful and exact sanitary survey of a certain rural district in that state, relative to the amount of this disease, and found that in some parts of this district the death-rate from tuberculosis exceeded that of Milwaukee, Wisconsin's largest city.

Minnesota also discovered that it had much tuberculosis in its rural districts. "As serious," says Dr. Daugherty, who investigated the subject, "as that in the congested areas of the cities." Following a rural survey of several townships, under the auspices of the State Antituberculosis Association, there were found housing conditions much as I have described in the preceding pages as existed in Pennsylvania. "The average number of people sleeping in one room," says the report, "was four." "In one house there were eight, in another nine, and it was not at all uncommon to find five or six. This was not due to the fact that there was not enough room, for in many of the houses the whole family would sleep in one room, use one for the kitchen, and leave two, three, and in some cases four, rooms vacant."

Coincident with this bad housing there was found one township where there were twenty-two deaths from tuberculosis in a population of 500 in ten years: a death-rate of 44 per 10,000. These investigators in Minnesota also found that "contributing causes, as overwork and poor food, which play such an important part among the inhabitants of the crowded tenement districts, do not usually count for much in the country. Bad housing and unrestricted exposure to contagion seem to be the great factors." Of course, in certain well-to-do farming districts, such as were under investigation in Minnesota, this would hold good, but in many other places, especially in parts of Pennsylvania known to the author, poor food and lack of food are a vast contributing cause of this disease. A poor constitution to start with and insufficient food soon engender a condition which quickly yields to the inroads of the bacillus.

31. LEARNING HOW TO SPEND[1]

By JOHN M. GILLETTE

The rural problem is not, for the nation as a whole, a problem of improving production chiefly, although there are sections, such as much of the South, where improved agriculture must take place before other essential things may be added unto them. Increased production should mean an increased profit and this in turn should mean higher standards of living, better education of children, and improvement in the methods of living. The very center and essence of the rural problem is the necessity of securing the establishment of a new point of view, a wider and more vital outlook on the part of the residents of the rural regions. In the matter of living, a new outlook on life, its meaning—its possibilities of enjoyment and satisfaction, and the means which are fit to secure those ends—is intensely needed. Life to the average farmer is devoid of the larger and more attractive elements. His life is a round of eating, working, sleeping, saving, economizing, living meagerly, recognizing only the bare necessaries, skimping along with inconveniences, especially in the home, which is uncalled for considering his wealth. The wealthy farmer is one of the most helpless of men in the matter of finding satisfaction. This appears whenever he moves into the city to live. He still practices the stern economies, lives in houses without modern conveniences, keeps the old rag carpets, attends no theaters, goes to no lectures

[1] Adapted from *The Annals*, XL (March, 1912, on "Country Life"), 21–25.

unless they are free, and acts as a man in a strange world or as one with a starved soul. The enjoyment side of life is lacking. His cultural and aesthetic soul is in a state of suspended animation.

Such facts as these in the lives of the multitude of rich residents of rural districts make it apparent that the fundamental problem is not one of economics but of transforming farmers so that they look at life in a different manner. The appreciative qualities of life must be built up. They need to have developed the sentiment that the fullest and most successful life is the one which obtains the greatest number of satisfied wants in passing. Under this transformation the country will build good houses, comfortable in the modern sense, having the conveniences which lighten the lives of the indoor workers, and the equipment which renders the place sanitary and healthful. It will put in machinery everywhere possible to do the hard work, to reduce chores, as well as make production more profitable. It will beautify the grounds, improve the roads for travel purposes, and look to nature as a source of inspiration.

A very large part of the emphasis in the discussions of farm life has been laid on the necessity of improving it in order to keep the boys and girls from drifting to the cities. The assumption has been that the country needs them and that city attractions established in the country would be effective in holding them there. However effective this procedure might prove to accomplish what is urged (and its effectiveness may well be doubted), it does not appear to be the highest motive which may be furnished. A more just view regards the improvement of farm life as a procedure which of right belongs to that great multitude of good people who will always be rural residents. They have a humanity in common with the residents of cities. They have needs of life and work which they ought to realize if they can only obtain a vision of their possibility and worth. They are the heirs of the products which the myriads of the makers of civilization have created and conserved and should of right come into the enjoyment of them. Country populations have a right in their own stead to enjoy all that life offers, even if they do not contemplate leaving the soil for the city. The great problem is to discover a way by which their outlook on life and society may be transformed into one which appreciates the worth of realizing the greatest satisfactions and possibilities which may come to them as rural citizens of the great republic.

32. AN EFFICIENT STANDARD OF RURAL LIFE[1]

By T. N. CARVER

In many parts of the country a distinct tendency is noticeable for the old population to give way for a new population of an entirely different type. In parts of New England the new population is French-Canadian, Italian, Portuguese, Polish, and, in a few places, Swedish. In some parts of the country a second phase of this process is showing itself. Foreigners of an earlier migration are being displaced by foreigners of a later migration. The incoming population seems always to be a population with a lower standard of living than that which is displaced.

This is an important economic fact to be considered. Is it true, and must it always remain true, that the men with the lower standard of living shall drive out the men of the higher standard? A restriction of immigration, coupled with a minimum-wage law, would accomplish something, but it is difficult to see how it would stop the farmers with a lower standard from buying or renting the land away from farmers with a higher standard. Of two farmers who are able to grow equally good crops the one with the cheapest standard of living can accumulate capital most rapidly. He, therefore, can outbid the other in competition for land, whether they are in the market as buyers or as renters. The minimum-wage law could not affect this process at all, and the restriction of immigration would only retard it. Immigration from heaven is quite as much a factor as immigration from the Eastern Hemisphere, and immigration from heaven is favored by a low standard of living. The battle of the standards is inevitable, and the victory will go ultimately to the most efficient. In other words, in the final result a standard of living is protected by its own efficiency, and by that alone.

This suggests the important distinction between a high standard and an efficient standard. A high standard of living ordinarily means merely an expensive standard. If every additional expense added to one's standard of living adds correspondingly to his productive efficiency, then a high standard is also an efficient standard; but if it does not in some way increase his efficiency, then it is merely an expensive standard, and will handicap its possessor in the struggle for existence, whether that struggle is waged by the destructive methods of warfare or the productive methods of economic competition. The

[1] Adapted from *The Annals*, XL (March, 1912, on "Country Life"), 21–25.

problem of the permanent maintenance of a high standard of living is, in final analysis, the problem of rationalizing the high standard and making it efficient. Otherwise it will sooner or later be driven out by a lower standard. This is also the problem of civilization, for, unless this problem of rationalizing the high standard of living can be worked out, so that it can hold its own against low standards, then, as soon as we have exhausted the native resources of our continent and European races have lost their market for their manufactures, our civilization must sink back to the condition of all old civilizations, where the mass of the people live on the minimum of subsistence. When, therefore, we begin to take the long look ahead, we shall find that the problem of the consumption of wealth is the most fundamental of all economic problems.

How then can an American standard of living defend itself against displacement by a cheaper standard? The only answer is: by becoming a rational and efficient standard instead of merely an expensive standard. That is to say, if the increased expenditure of the American farmer's family can be made to yield returns in greater efficiency, greater intelligence, greater mental alertness, more exact scientific knowledge and calculation, then the American farmer will not be displaced by the foreigner. But if the rising cost of living for the American farm family is due to a mere demand for luxury, for expensive vices, and for ostentation, then there is no power on earth which will protect his standard of living. Such a farmer is handicapped in competition with the more simple-minded foreigner, and the latter will offer such prices for land as the former will not be able to pay. Being unable to maintain a family on such a standard, this type of American farmer will sacrifice his desire for a family, will have few children or none at all, and in a few generations will disappear altogether. The change in the characteristics of our rural population is, from the point of view just discussed, merely a phase of the universal struggle among standards of living, and, here as elsewhere, efficiency wins. Whether we like it or not, this struggle is going to continue, and the victory is going to fall on the side of efficiency. The sooner we accept this fact, and make up our minds to adjust ourselves to it, the better it will be for us.

III

LAND AND OTHER NATURAL AGENTS OF AGRICULTURAL PRODUCTION

Introduction

To estimate the area of our five continents and our many islands, or to survey the surface of the United States, is to get but little information about the land as a factor in the production of agricultural goods. Fifty-seven million square miles—this is little if anything more than a mathematical declaration, the skeleton of an idea, which needs be filled in by much critical analysis of quality. Obviously some of this land yields no product, some yields a little (repaying the harvester but not justifying tillage), other portions respond moderately to man's labor, and a little gives bounteous return to husbandry.

There are absolute frontiers of cold and drought and flood; there are relative limitations of yield, due to too much as well as too little heat, to either scarcity or overabundance of moisture. Nor is the productiveness of land a consistent quality. Being subject to the fickle changes of the weather, the product of a whole season may be decimated by an unseasonable frost or a single devastating storm of hail or wind, or greatly increased by an opportune rain or a fortnight of favoring sunshine.

Not only does fertility (whether due to chemical, physical, or biological conditions) vary from region to region and even from acre to acre, but "the original and indestructible powers of the soil" fluctuate up and down with great rapidity, in response to good or bad methods of farming.

Finally, there is a frontier of rough or steep land, which stops the farmer's progress not less than does the cold frontier or the dry frontier. Just how far short of the perpendicular this limit shall fall we are hardly prepared to say, but it is known that in extreme cases agriculture may succeed in conquering slopes of as much as forty-five degrees, and sheep and goats can glean some products from even steeper hillsides. It is evident that the practical penalty which land suffers as a result of roughness of topography appears in the form of soil erosion, difficulty of tillage, and poor transportation facilities.

Here, again, the question is one of degree, and we pass from lands that are absolute waste to grazing lands, orchards, and better and better types of field tillage, with larger fields, lighter draft on farm implements, better roads, and cheaper freight rates.

It is apparent that we are dealing in all this with two sets of conditions—one absolute, the other relative. Degrees of temperature, inches of rainfall, and angle of slope—these are absolute facts. But the actual technical productivity of land possessing a given measure of these positive attributes is a relative matter and depends upon our technique of production. The *effective* qualities of land are those which men have learned to understand and in some measure to control. The character of land as a technical agent of production thus undergoes a change with every addition to the science of agriculture, with every new discovery concerning soil fertility or plant or animal behavior.

This may seem at first glance to make the category of "land and other natural resources" very inclusive and to threaten to bring into it some of the human factor that we are in the habit of classing under the head of labor. As a matter of fact, however, it serves rather to complete the discussion of the contribution which nature makes to the productive process. Our knowledge has been greatly enlarged in this direction since the day when Ricardo spoke so unluckily of original and indestructible powers. But this expanding knowledge has never been very fully taken into account by our economic theory, perhaps because general economics has been so largely concerned with industrial problems and thinking so often in terms of the standing-room or location aspect of land. In agricultural economics, the stress is of necessity upon this very question of the productive contribution of land and its appurtenances, of life forms and natural forces. We are therefore forced to explore somewhat, or rather to take due account of the explorations of the scientists, and to build our economic theory accordingly. They aspire to tell us not only the forms in which nature presents herself but also the forces which she offers to mankind to use to reshape these forms to his advantage. The potentialities of plant breeding or nitrogen fixation must go into our inventory of the land and its resources quite as much as the area of the land or its present state of fertility.

But such qualities are quite distinct from the labor of the men who utilize them or the objects in which they are embodied. We may illustrate this by reference to the principles of heredity and the

practice of scientific breeding. Mendel's law (or, rather, the fact of hereditary transmission of characters, on which it is based) is evidently some part of the natural resources with which we may work toward the end of agricultural production, and by which we must be limited in that endeavor. But the personal ability with which this or other principles of inheritance are applied to the art of cattle-raising depends upon human factors and is to be classed as an attribute of labor. And the product of these clever or clumsy attempts to use nature's resources makes a third and separate factor of production, capital-goods. Such goods have productive qualities of their own, and for the duration of their existence, crystallize some fragment of the potentialities of nature and man into the concrete powers and limitations of a particular tool for further production.

Finally, we face the question of conservation. This, we must remember, is a matter of economic judgment, but upon a basis of scientific fact. The more we know about the land as a productive agent, the more sound should be our judgment as to what can best be done to preserve and increase its productivity.

In analyzing the problem we need clearly to distinguish between productive use of the land, which use has in it an inevitable element of impairment; waste of natural resources which is incidental to this productive use but which adds nothing to the product; and waste of the land through waste of its products in connection with the processes of consumption. A rational conservation movement begins by discovering where and how productive resources are being destroyed, and by measuring the amount of such impairment. Second, it examines where this wealth has gone and to what use it has been put. Third, it enquires how much of these materials might be returned to the land or need never have been taken from it. Finally, the ultimate economic problem is how much it would cost thus to conserve the given amount of natural wealth. Some enthusiastic conservationists have urged us to save one dollar's worth at two dollars' cost.

Certainly there is no complete and final formula to be applied in answering the conservation riddle. Our policies must be those of expediency with reference to the concrete circumstances of time and place. Not only do the economic circumstances of costs and prices undergo a constant process of change, but the technical situation with reference to which they must be considered is bound to alter in the future as it has in the past. The preparation we make for coming years will depend upon what kind of a future we expect it to be. If

we have faith that we shall discover new resources and attain to a better control of natural forces, we are certain to discount the dangers that less optimistic men foresee. Only when that future has arrived will it become clear whether we have ordered our activities by a rational faith or have been reckless and unsuccessful gamblers.

A. Area the Fundamental Fact

33. SOME FIGURES CONCERNING LAND AREA

The latest estimates of the land area of the earth show a total of nearly fifty-eight million square miles, as follows:

Asia	17,470,282 square miles
Africa	11,632,000
South America	7,344,508
North America	7,146,641
Europe	3,671,624
Australasia	3,456,290
Polar regions	6,970,000
Total	57,691,345

Only about half of this area is to be thought of as even potential agricultural land, as is seen from the following rough classification:

Steppes	14,000,000 square miles
Polar regions	6,970,000
Desert	4,861,000
Fertile area	29,000,000

For the United States, the figures are as follows:[1]

	Acres (1910)	Per Cent of Total Land Area	Acres (1900)	Per Cent of Total Land Area
Land area of the country	1,903,289,600	100.0	1,903,461,760	100.0
Land in farms	878,798,325	46.2	838,591,774	44.1
Improved land in farms	478,451,750	25.1	414,498,487	21.8
Unimproved land in farms	400,346,575	21.0	424,093,287	22.3

[1] Figures given in the Thirteenth Census. The decrease in total land area in 1910 is due chiefly to the building of the large irrigation reservoirs in the West and to the formation of the Salton Sea in California.

B. The Relation of Climate to the Productivity of Land

34. AGRICULTURE'S "FARTHEST NORTH"[1]

By W. P. RUTTER

It has been denied that wheat can be raised in Canada north of 55 degrees north latitude, but this notion has had to be abandoned, for wheat is gradually creeping nearer and nearer to the Arctic Circle. At Sitka, Alaska, 56 degrees north latitude, spring wheat matured in 1900 and 1901. In the Peace River Valley wheat has been successfully grown for some years past, and at Fort Vermilion, north latitude 58.4 degrees, there is a roller mill whose capacity is thirty-five barrels per day, and the wheat ground in this mill is all grown in the vicinity. Wheat has been harvested at Fort Simpson, in north latitude 61.8 degrees, and at Dawson City, 64 degrees north latitude, wheat has matured in favorable seasons. In the more northerly tracts, however, present factors show that the chances of failure are too many for wheat cultivation to be a commercial success.

A fact of peculiar interest is that the summer season in the basin of the Mackenzie River is nearly as warm as in Alberta. At Edmonton and Calgary the mean summer temperature is 59° F., at Dunvegan, 58° F., at Fort Chippewyan, 59° F., and at Fort Simpson, 57° F. The explanation lies chiefly in the fact that the insolation, or heat received from the sun, scarcely varies about midsummer between the parallels of latitude 40 and 60 degrees; the larger number of hours the sun is above the horizon in the higher latitudes very nearly balancing the effect of less direct solar radiation. Southern Alberta has a much milder winter than the rest of Northwest Canada. The cold becomes greater to the eastward, and northward the change is even more rapid, and in strong contrast to the small variation during the summer: Calgary, 17°.1 F.; Edmonton, 13° F.; Dunvegan, 1° F.; Fort Chippewyan, −5° F.; and Fort Simpson, −13° F. But it is the spring and summer which are the important seasons to the wheat-growers of Northwest Canada.

Throughout the region the spring is short and the farmer must utilize fully every day from the last days of March to the last days of April. In Eastern Canada, where the snowfall is heavy and often packed by thaws, the farmer waits until the snows melt and the frost is out of the ground before commencing spring seeding. Not so in

[1] Adapted from *Wheat Growing in Canada, the United States, and the Argentine* (Adam and Charles Black, London), pp. 4–5, 44–46, 54, 59.

Northwest Canada, for the snow goes soon, being light and never packed. As soon as six inches of the soil are thawed the grain is sown; nor does the farmer trouble about the frost coming out of the ground. As the frost relaxes under the warm sun, the moisture resulting feeds the young roots, and they are provided with an excellent foraging ground. By the end of April all wheat should be sown in order that the warm, moist days of the early summer may contribute to the germination of the seeds. During May and June the temperature rapidly rises, and from the middle of May until the end of July the heaviest rainfall occurs. During July and August bright hot days are frequent, and temperatures exceeding 90° F. have been recorded.

A point of great importance in Canada's climate is the percentage of sunshine; nearly all parts of the Dominion have an annual percentage of over 40, and a summer percentage of between 53 and 59. This aids in the perfect development of high-grade wheats.

35. THE DISADVANTAGE OF TOO MUCH HEAT

While it is true that the possibilities for agricultural production diminish as we approach the arctic zone, the opposite statement, namely, that the farther from the pole we go the better are the conditions of agriculture, would not be strictly true. As we move away from the subarctic environment we enter regions of longer growing season and more intense heat, regions which have no extreme winter temperatures to preclude the growing of the deciduous fruits, and regions in which farm animals can be cheaply housed and cheaply fed during the winter season. But as we go farther toward the equator we find that this is not an unending cumulation of blessings, but, to no small degree, means merely the substitution of one set of agricultural products for another and of a fleeing from ills we perchance know to others that we wot not of. As we enter the land hot enough for cotton and sugar-cane and citrus fruits, we find that we must drop buckwheat, apples, many of our vegetables, and other equally valuable items from our planting list. As we leave the land where frost sometimes nips the buds in spring or the immature crops in autumn, we enter the land where frost fails to help the husbandman to hold weeds in check and where "the worm dieth not" but the boll-weevil and the fever tick and the tetanus germ ravage crops and stock for twelve months of the year.

Likewise, the absence of frost increases the losses due to soil erosion and the leaching out of plant food; greater heat increases the

rate of evaporation and thus enlarges the demand for rainfall to satisfy the farmer's crops. Finally, "heat rigor" is as real a drawback as the checking of growth by cold. That is, there is a maximum temperature which any given species of plants can tolerate, and this marks the upper limit of its possibilities of growth. Even before this point is reached, growth may be distinctly retarded—a condition familiar to all through its manifestation upon plant life in the hottest period of summer weather.[1]

The handicap of the tropics is well portrayed by Professor Ellsworth Huntington in a recent article on Guatemala.[2] He says:

We are apt to think of tropical lands as places where vegetation is exuberant and where a living is obtainable with extreme ease. As a matter of fact, in vast portions of the torrid zone it is harder to get a living than in the temperate zone. In the true tropical forest, agriculture is practically out of the question. Even for the white man it is difficult to clear the ground, and for the sluggish son of the tropics it is almost impossible. In the tropical rain forest bushes will grow to a height of ten to twenty feet in a single year. Indeed, in the short space of two months so much herbage will spring up that a piece of forest which has been cut cannot be burned, even though the trees have become dry.

This is not theory, but actual fact. In the spring of 1913, in a part of Guatemala where the forest is by no means of the densest kind, and where a considerable number of coffee plantations exist, I saw this happen. The trees had been cut, but so many showers fell during the nominal dry season that the branches did not become dry enough to burn, and consequently many people were unable to plant crops. One might ask why they could not plant old fields cleared in previous years. The answer is simple. In this particular region the staple product is Indian corn. The first year after new land has been burned it gives a splendid crop; but if the same tract be planted a second time, the crop is so poor as not to be worth raising. Just why this is so is not certain; perhaps because the abundant rains leach out certain elements of the soil very rapidly; perhaps because the warm, humid conditions of the ground develop toxic substances inimical to cultivated plants; or perhaps because the heat of the sun causes the soil to decompose with great rapidity, and hence quickly to lose its strength. At any rate, the fact remains that it seems to be impossible to cultivate the same tract more than one year at a time. The ordinary practice is to clear and burn an area, plant it a single year, then leave it to grow up to bushes for from three to five or ten years, and then, when the soil has

[1] See E. Davenport, *Principles of Breeding*, pp. 255–57. (Ginn & Co.)

[2] *Yale Review*, April, 1914, p. 506.

recovered, to go once more through the whole process of cutting, burning, and planting.

Evidently, then, vast areas within the tropics are beyond the pale of agriculture, or else can be cultivated only in a most haphazard way. The kind of intermittent agriculture which alone is possible in many jungle-covered parts of tropical lands is most demoralizing. Inasmuch as the people must change their fields every year and may in some years be unable to burn the brush which they have cut, they have no feeling of permanence. In many cases there is no definite ownership of land, and even where this exists the owner has nothing to encourage him to improve his holdings. It is useless or, in fact, sheer waste of time to attempt to improve a tract which next year is to be abandoned once more to the jungle.

36. LOCAL AND SEASONAL PECULIARITIES OF CLIMATE

a) FROSTS[1]

By HARRY J. WILDER

The controlling factor in grape production is not one of mean seasonal temperature, but rather of seasonable and unseasonable frosts. To illustrate (in the region of northeastern Pennsylvania, adjacent to Lake Erie), an equalized temperature curve extends from the lake shore belt southward to include almost all of Crawford and Mercer counties, but the length of the frost-free season is much greater along the lake shore than well up on the escarpment. The tempering influence of the lake on the climate of the adjoining plain is well known. A further fact has been demonstrated in that a part of this modifying influence extends for at least a little way up the escarpment slope to the south, thus making possible an extension of the vineyard interests. But it is only for a short distance south of the escarpment that the frosts are held off long enough in the early autumn to make grape growing safe.

In the southern district, too, the advisability of setting tree fruit, particularly apples, depends in some measure upon the relative immunity from late spring frosts, while the corn crop and vegetables as well are similarly affected. These climatic problems are primarily local rather than regional in scope, as is illustrated by the frequent loss, in hollows or depressions, of fruit and other crops by late spring frosts.

[1] Adapted from *10th Report of the Field Operations of the Bureau of Soils*, pp. 220–23 and 1169–73.

In the accompanying table are given weather records to illustrate the condition at different stations in the area:

DATES OF FIRST AND LAST KILLING FROSTS

Year	Erie		Saegerstown		Wellsboro, 1,327 Feet Above Tide	
	Last in Spring	First in Fall	Last in Spring	First in Fall	Last in Spring	First in Fall
1901.....	April 10	Nov. 19	May 15	Oct. 4	May 16	Oct. 4
1902.....	April 8	Nov. 8	May 29	Oct. 8	May 29	Sept. 6
1903.....	April 5	Nov. 11	April 28	Sept. 29	April 6	Sept. 29
1904.....	April 21	Sept. 22	May 12	Sept. 22	May 12	Sept. 22
1905.....	April 22	Oct. 26	May 24	Oct. 26	May 21	Sept. 27
1906.....	April 8	Nov. 1	May 10	Oct. 1	May 21	Oct. 12
1907.....	April 20	Oct. 19	May 22	Oct. 9	May 30	Oct. 6
1908.....	April 17	Nov. 13	May 5	Sept. 30	May 10	Sept. 16
Average..	April 14	Oct. 30	May 14	Oct. 5	May 14	Sept. 26

It will be noticed that the shore belt represented by the Erie records has a much longer season free from frosts than any of the other stations.

b) A MARGINAL CLIMATE[1]

By MACY H. LAPHAM

The most striking and characteristic climatic features of the area with which this report deals (western North Dakota) and which is embraced within the climatic province of the semiarid Great Plains are a restricted and variable annual precipitation, long, severe winters, and a relatively brisk wind movement. The average annual precipitation is rather limited for the successful production of crops under ordinary methods of farming. The distribution of rainfall is, moreover, somewhat fickle, varying greatly from year to year. The greater proportion of the precipitation occurs during the summer months as heavy local showers, often accompanied by thunder and lightning. For Williston, the Weather Bureau records exhibit an extreme variation in the total precipitation between the wettest and the driest observed years of 15.9 inches (7.4 inches to 23.3 inches).

While the area under discussion lies in the path of most of the storms sweeping across the country from the Pacific Coast, the air currents have been robbed of their moisture in crossing the slopes and crests of the elevated mountain chains to the westward. The greater portion of the rain falls during the growing season, however,

[1] Adapted from *10th Report of the Field Operations of the Bureau of Soils*, pp. 1169–73.

thus favoring the growth and maturity of the crops. The years of greatest rainfall are not always the most favorable years for the production of crops, the harvesting of a successful crop seeming to depend more upon the absence of hot, drying winds and upon the timeliness of the rainfall rather than upon the total amount precipitated. The snowfall varies from but a few inches to several feet. It is, however, generally of a dry character and is readily removed from the exposed prairie surface and slopes by winds, so that while collecting as deep drifts in coulées, railroad cuts, or in other depressions, the grazing of stock upon the exposed hillsides and slopes in the broken lands is usually not greatly interfered with.

Hailstorms are of relatively frequent occurrence and are often very destructive, and the insurance of crops against damage by hail is a common practice. Hailstorms are, however, of local character, and while the destruction wrought to crops is often complete, it is confined to relatively narrow strips or to small spots, and but a small proportion of the country is affected during any single season.

The winter season is long and generally marked by long periods of severe temperature, ranging well below zero, and occasionally reaching —30° to —40° F. Killing frosts may occur early in September, the average date of the first killing frost falling about the middle of this month. The last killing frost is generally looked for about the middle to the latter part of May, but light frosts may occur in almost any month of the year. During the summer the days sometimes become extremely warm, 90° to 100° F. or even higher temperatures being occasionally reached; 114° has been recorded at Medora. Nights are usually cool, a variation of from 50° to 60° between the extreme temperatures of the day and night being sometimes experienced.

The wind movement is generally brisk and days of relatively high winds are not of infrequent occurrence, particularly during the winter and spring months. Gales of considerable severity often accompany the local thunderstorms of the summer months. Damage is sometimes caused by the lodging of grains or the insecuring of farm buildings occupying exposed places. During the summer months there are brief periods of hot, dry winds, causing excessive evaporation and, when these occur during periods of drought, sometimes injuring the growing crops.

The popular belief that a permanent climatic change has taken place and that there will be no further repetition of successive seasons of unusual drought is unfounded.

c) WINDS[1]

By L. E. HAZEN

The long-continued droughts in the semiarid belts are no more of a proposition than the excessive winds. As a rule, such crops as wheat, barley, rye, sorghum, cowpeas, and Kafir corn will withstand a drought of six weeks to two months fairly well if there is no wind. Alfalfa will grow on 11 per cent of water in the first 3 feet, retaining a rich green color; two hours of 40-mile wind will stop all growth and cause a yellow tinge to appear on the leaves with 18 to 20 per cent of water in the soil and an air temperature of not over 80° F.

The high evaporation of moisture from the soil in the western country is due largely to the high velocity of the wind. The cultivation necessary to store moisture and produce the perfect tilth required for the best growth of the crop favors the blowing of soils. There has been much written to explain how to establish a soil mulch, but so far there is little information as to how to keep it. A soil mulch will check evaporation, but the first stiff wind will blow the mulch away. The clean-cultivated land at the Hays, Kansas, Experiment Station blows very badly each spring, as the records show; land which is lightly tilled does not suffer much.

The following notes are taken from the records of the Station:

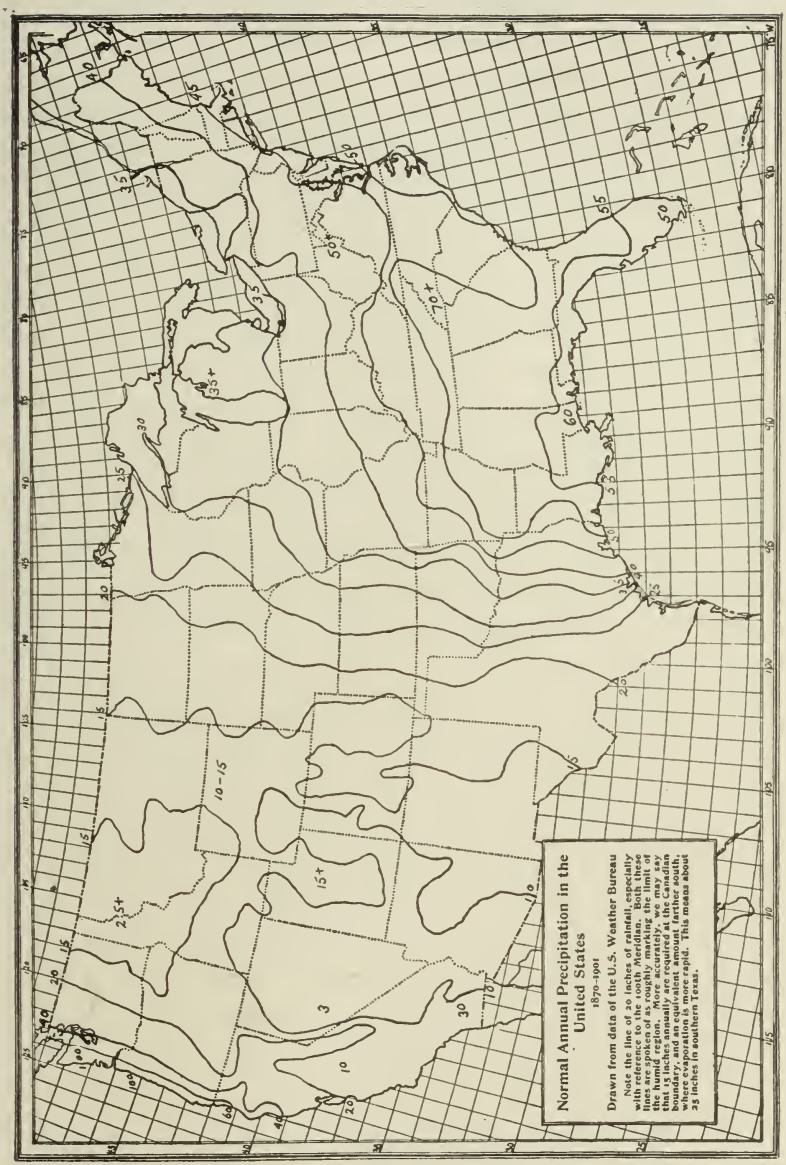
March 1, 1905.—During the three day's high winds this whole field blowed badly and considerable wheat is covered because of the flying dirt particles having lodged behind sorghum stalks and in low places. Wheat plants appear rather sickly, though the part in the ground is alive and thrifty.

April 24, 1906.—The high wind of today did much damage to all spring crops that were above ground, and the barley and spring wheat east of the road were affected most, because of the constant drifting of particles from the wheat fields on the west side of the road.

From another field, kept in clean cultivation throughout the season, the dust blew in clouds and drifted so thickly in the adjoining field as to kill weeds and grass in places. The influence of wind-breaks on the velocity of the wind is but local. We must depend upon some other method of preventing the loss of soil than by foresting this great area of land which we seek to put under the plow.

[1] Adapted from "Dry-Land Agriculture," *Bulletin 130, Bureau of Plant Industry, United States Department of Agriculture*, pp. 51–53. The last two sentences and the first two in the second paragraph are borrowed from a paper by E. A. Burnett, pp, 10–11, of the same bulletin.

37. ANNUAL RAINFALL OF THE UNITED STATES



38. THE POSSIBILITIES OF IRRIGATION FARMING[1]

By CARL S. SCOFIELD

According to the returns of the Thirteenth Census, there are in the continental United States about 14,000,000 acres of irrigated land, or about 80 per cent more than existed ten years ago. Public interest in irrigation development found expression in 1902 in the enactment by Congress of the national reclamation law, under which irrigation water has been provided for about 1,000,000 acres of land. Under private enterprise, with some aid from state and national legislation, a much larger acreage has been put under irrigation.

As a people we are optimistic regarding irrigation farming, but it has only recently become an appreciable factor in American agriculture, and it is not yet a factor of great importance if considered only from the standpoint of the area involved. Accepting the estimate of 14,000,000 acres, the total irrigated land is but little more than one-third the size of the state of Iowa. To make this comparison, however, does an injustice to the real economic significance of the movement. It is not the sole purpose of irrigation to produce foodstuffs for our eastern and European markets. It serves also to provide homes on the land in a salubrious climate and to support the people engaged in stock raising and in developing the mineral wealth of the western states. But as the area of irrigated land has increased and as the total production has exceeded local demands, the surplus has had to see outside markets, there coming into competition with the products of unirrigated land. This competition seems certain to bring about some readjustments in the methods of irrigation farming.

It costs more to produce a crop under irrigation than under rainfall. Consequently, unless the yields are larger, or the prices higher, the margin of profit to the producer must be less with irrigation than without. It is a popular assumption that crop yields are much larger under irrigation than under rainfall, but it is doubtful if the data available warrant this assumption in so far as it applies to most of the staple farm crops. There can be no doubt that in many irrigated sections of the Western United States the soils are so fertile and the climate so favorable that when irrigation water is applied bountiful crops may be secured. But profitable agriculture does not depend solely upon the successful growth of the crop. The costs of produc-

[1] Adapted from "The Present Outlook for Irrigation Farming," *Yearbook of the Department of Agriculture*, 1911, pp. 371–82.

tion and the relatively higher charges for transportation and distribution are very important factors. And, further, the prosperity of some of the irrigated sections of the West has been more largely due to increases in land values than to the profits of crop production.

The fixed charges of irrigation farming.—Not infrequently the overinflation of land values may become the most serious economic problem of an irrigated region. Land that represents an investment of $25 an acre, with a fixed interest charge of $2 an acre per annum, might yield a fair return in some low-priced staple crop, while the same land at $200 an acre, with a fixed interest charge of $16 an acre per annum, must be devoted to a high-priced crop unless it is to be farmed at a loss. Too often a new settler in a region overlooks this significant point.

The fixed charges for interest and depreciation on equipment, though often overlooked by the farmer, are very real items of expense. They are frequently less in an irrigated section than elsewhere, particularly where the climate is mild and inexpensive buildings will serve for sheltering stock and machinery. The charge for irrigation water is a factor peculiar to irrigated land, but is one not usually overlooked by the prospective colonist nor long forgotten by the actual settler.

The labor cost of crop production.—There is very little satisfactory information as to the cost of crop production in different sections of the country, and none that permits direct comparison between farming with irrigation and without. Such items as planting and tillage should be much the same in both cases, but the preparation of the land, which includes leveling for irrigation, is often an important item of expense. The cost of harvesting crops may be in some instances less under irrigation, because of the lessened need for hurry to avoid rain or storm injury.

The cost of marketing crop products.—Many of our irrigated sections are isolated and far from market centers. In all cases where the production of a crop exceeds the demand for local consumption the local price at once falls to correspond to the distant market price, less the freight and commission charges. When an irrigated region is first settled the local prices of staple crop products, such as grain and hay, are often very high. The local demand for these products is due to the needs of incoming settlers, who must buy feed for their work stock until their own farms come into production, or to the needs of those engaged in the construction of the irrigation system, or for

feeding stock on adjacent range land or isolated mining camps. During the first years in such a section the local prices are based on cost of products in some older producing section *plus* the freight. As soon as the local production exceeds the local demand, a complete reversal takes place and prices drop to a point which is determined by the outside market prices *less* the freight. It is in this period of readjustment to the new market conditions that the real and discouraging hardships of the new settler are felt—the time when water payments lapse and the less persevering give up the struggle. This period of depression is a feature of the development of nearly every new irrigated section.

The need of special crops or industries.—Relief comes in finding other crops that serve local purposes or that are of higher value, so that they can bear the cost of transportation to outside markets and yet leave the producer a profit for his labor. It is fortunately true that many of our irrigated regions enjoy such favorable climatic conditions as to permit the production of crops that thrive poorly or not at all under rainfall agriculture. Such crops as dates, figs, olives, English walnuts, and Egyptian cotton are pre-eminently suited to the irrigated sections of the Southwest. Certain truck crops, such as cantaloupes, asparagus, and Burmuda onions, may be put on the market from our southern or southwestern irrigated lands at a season when prices will cover the high cost of production and transportation.

Many irrigated sections are situated in the midst of range lands devoted to raising cattle, sheep, and horses. Irrigated agriculture may supplement the grazing industry in a very profitable way. Live stock may be produced cheaply on the range, but the cattle and sheep need to finish their growth on grain and hay in order to bring good prices in eastern markets. Also, the most economical use of the range requires that the stock must be given some forage in addition to the range during part of the year, whether sent to market or not. Most irrigated land is well suited to alfalfa, which is one of the best meat-producing forage crops. Likewise such dairy products as butter and cheese find a ready market at any time and are so concentrated that transportation charges are relatively small. Orchard fruits and truck crops are much exploited as a means of large profits in favored sections. But many of the highly favored regions are small and definitely circumscribed. Keener competition from eastern lands in the production of such fruits as apples, pears, and peaches for eastern markets is certain to come in the near future.

The prospects of sustained productivity.—The use of irrigation water as an aid in crop production is as old as history, but the history of irrigation is, with some exceptions, a story of rise and decline.

Our modern irrigation development in this country is still too new to give very definite indications as to what may be expected in the future. Some disturbing symptoms have appeared in recent years on our older irrigated lands, but as a people we are going deeper into agricultural science than our predecessors, and it remains to be determined whether or not we can meet and overcome the difficulties that have caused failures in the past. Most people have only a casual interest in the welfare of posterity. But there are certain phases of this matter that are of acute interest to the irrigation farmer. What is known as the rise of alkali is a matter that may become serious in months as well as in centuries, and is a problem that is likely to become acute on nearly every tract of irrigated land.

The so-called rise of alkali may be defined as the accumulation in the soil of soluble salts which are the products of soil weathering and disintegration. Whenever this accumulation becomes excessive these salts hinder or prevent the growth of crop plants. These salts seldom accumulate in harmful quantities where the rainfall is adequate, because they are usually leached out of the soil as fast as they become soluble. If it were possible to apply irrigation water in such a manner and in such quantities as to provide the crop plants with what they need and in addition to insure some percolation of water through the soil into the underground drainage, it seems probable that one of the most acute difficulties of irrigation would be overcome. But this is not easy to accomplish. In the great majority of cases the land is irrigated too little or too much. When irrigated too little the salts remain and accumulate in the soil, and when irrigated too much they are transported from one place only to come to the surface in another where the ground-water collects. Thus the use of irrigation water under the ordinary conditions of farming results in serious disturbances in the normal equilibrium between the soluble and the insoluble constituents of the soil. And these disturbances are soon manifested by consequent derangement in the nutrition of the crop plants. Methods of control involve, among other things, the maintenance of a supply of organic matter in the soil and at least the occasional percolation of water through it.

Aside from cases where alkali or seepage water is the obvious cause of a decline in the productivity of irrigated land, there are other

causes of decline that are not well understood. The evidence thus far available indicates that the deterioration of irrigated land may be due in some cases to obscure diseases of the plants or to some derangement of the processes of nutrition rather than to a lack of fertility, as that term is understood in agriculture under rainfall. Whether or not there is inherent in irrigation agriculture a set of adverse conditions other than those related to the rise of alkali remains to be determined. In any event there is reason for believing that many of our irrigated districts may long continue in a high state of productivity because the available land so much exceeds the available water that when any particular tract of land becomes unproductive the water may be carried to new land at small additional expense. But such shifting of water to new land must often result in some individual hardships where a farmer has all his capital invested in the land that is abandoned.

NOTE.—The Thirteenth Census (Vol. V, p. 846) gives the following figures concerning irrigation development in the United States:

	Acreage Irrigated in 1909	Acreage Enterprises Were Capable of Irrigating in 1910	Acreage Included in Projects
All classes of enterprises	13,738,485	19,334,697	31,111,142
U.S. reclamation service	395,646	786,190	1,973,016
U.S. Indian service	172,912	376,576	879,068
Carey act enterprises	288,553	1,089,677	2,573,874
Irrigation districts	528,642	800,451	1,581,465
Co-operative enterprises	4,643,539	6,191,577	8,830,197
Individual and partnership enterprises	6,257,387	7,666,110	10,153,545
Commercial enterprises	1,451,806	2,424,116	5,119,977

—EDITOR.

39. NEED OF IRRIGATION IN THE HUMID REGION[1]

BY MILO B. WILLIAMS

The people of this country have come to associate the practice of irrigation with the growing of crops in localities where the scanty rainfall produces only desert plants. But in fact supplemental irrigation is not only possible but needed in the growing of the more valuable crops throughout many portions of the humid region.

A climate having an annual rainfall of 20 inches or more is generally regarded as humid, for where this amount of rain is fairly well

[1] Adapted from "Supplemental Irrigation in the Humid Region," *Yearbook of the Department of Agriculture*, 1911, pp. 309-20.

distributed throughout the year the arable land can usually be farmed. This measure of aridity divides the United States into two nearly equal parts, east and west, marked by a belt of semiarid country located near the ninety-ninth meridian. Although this division is based upon the moisture supply of the climate, it is not a true index of the need of irrigation, as many sections having an annual rainfall of more than 20 inches do not during the growing season receive a dependable precipitation sufficient for farming purposes. Rains must come at such times and in such amounts as will properly moisten the soil for the preparation of the seedbed and will furnish a reasonably constant supply of moisture to germinate the seed and develop the plant until it reaches maturity. A check in this supply of soil moisture at any stage of the growth affects the quality and quantity of the yield and may greatly reduce the profits of the grower. The real test of what is a humid section is therefore not the total annual rainfall, but the monthly, and, in the case of many plants, the weekly amount during the growing season. Viewed in this light, irrigation becomes a national need rather than merely a western practice.

One of the main advantages of farming under irrigation is that the water supply needed for the growth of crops, which is one of the most, if not the most, uncertain factors in other farming, is very largely under the control of the grower. This advantage, however, has hitherto scarcely been grasped by the farmers in the humid section, and few realize that with a small outlay an irrigation plant can be installed which will insure them against complete or partial crop failures during droughts. Although the annual precipitation in the citrus regions of Florida is 55 inches, while that at Riverside, California, is only 10.74 inches, one should not conclude that irrigation is not necessary in the former, as there are periods when less than 1 inch of rain falls in 30 days, and at such times the application of a small amount of water may be followed by as good results as at Riverside. Under average conditions it is safe to say a drought occurs whenever the precipitation in any 15-day period falls below 1 inch. It has been the writer's observation that crops will usually suffer if they do not receive considerably more than this amount of rain, especially during the spring and early summer months. Later in the season this quantity may not be needed excepting for late garden truck and some fruits. The accompanying table, compiled from rainfall records of the Weather Bureau taken at representative points in the humid region during 10 growing seasons, 1900–1909, inclusive, shows the

average annual rainfall, the number of periods of 15 days or more with less than 1 inch of rainfall, and the total number of days in the ten years that droughts extended over the 15-day period.

Stations	Average Annual Rainfall	Number of 15-Day Periods or over with Less than 1 Inch of Rain	Number of Days When Irrigation Was Required*
Ames, Iowa	30.39	23	190
Oshkosh, Wis	29.78	27	292
Vineland, N.J	47.47	46	352
Columbia, S.C	47.55	62	568
Selma, Ala	50.75	60	724

* No days counted till after a 15-day period with less than 1 inch of rain.

Of the north-central states, Iowa, Illinois, Ohio, and Indiana are probably the most favored states in the country from an agricultural point of view, and their common field crops are comparatively little injured by drought, though the more delicate fruit and vegetable crops suffer more. In Michigan, Wisconsin, and the northeastern part of Minnesota the needs of irrigation are much greater. The upland soils are a mixture of coarse and fine glacial materials, porous and non-resistant to drought, yet responsive to tillage and adapted to the growing of garden truck, berries, hardy fruits, hay, legumes, and sugar beets when moisture is applied. The lowland soils are sedimentary and vary in texture from heavy loams to porous peat. When thoroughly drained these soils are adapted to the growing of many of the most valuable crops. The wet condition before drainage does not indicate that the soils are immune from drought. Irrigation and drainage must go hand in hand to insure the greatest returns. For such purposes the water resources of these states are most abundant. Creeks and small rivers abound, and hundreds of lakes, large and small, afford the possibility of constant supplies for wilting crops in dry weather.

The growing seasons are short and the winters cold and bleak; it is necessary for the farmer to grow his crop without delay or set-back. Late planting caused by a dry spring may result in the crop being frozen in the fall before it is matured. In the spring of 1910 Wisconsin experienced a drought which did great damage in the garden sections. Fields prepared for the setting out of plants stood idle for weeks waiting for a rain to supply the necessary moisture, and when the rain came, at a late date, plants were rushed in on large acreages. This resulted in the maturing of many crops at the same

time and caused a flooding of the markets and a lowering of prices to an unprofitable figure. A later drought the same season caused the celery crop, valued at $1,000 per acre, growing on peat lands near Waupaca, Wisconsin, to develop seed sprouts, which ruined the crop An abundant water supply was within a few feet of the surface and a pumping plant could have been installed and the crop irrigated with profits that would have been realized from one acre.

On the other hand, 1½ acres of strawberries at Neenah, Wisconsin, yielded berries valued at $200 after the unirrigated vines in the same field had stopped bearing. An onion crop grown under irrigation in the same locality yielded 483.8 bushels per acre and the onions took first premium for quality at the Winnebago County fair. This crop was irrigated six times during the months of June and July and received 3.04 inches of water by irrigation and 5.77 inches by rainfall. This seemingly large amount of water was made necessary, as most of the rain came in one large storm and the balance in eleven small showers, none of which moistened the soil to a sufficient depth. Good results have also been secured from the irrigation of raspberries and apples in the same section of Wisconsin.

The states bordering the Atlantic Ocean from Maine to Virginia include a narrow strip of agricultural country wherein great possibilities seem to exist for that intensive type of farming to which supplemental irrigation is adapted. Many thousands of acres of virgin lands still lie idle awaiting the time when they will be reclaimed by scientific farming and moisture control. The greatest demand made by the markets upon agriculture in this region is for food crops for human consumption. Great areas are adapted to the production of these crops, and probably some of the most suitable lands are untouched by the plow because of their lightness of soil and nonresistance to the effects of drought. The Atlantic slope is well supplied with water resources for irrigation.

The climate of these states is tempered sufficiently by the ocean to give longer growing seasons than are found in the north-central states, thus enabling early summer and late fall vegetables to be raised with irrigation; and all tree fruits, from the northern apple to the temperate peach, thrive under care. Soil-improving legumes can also be grown in these sterile, tillable, sandy sections if moisture be assured. During a New Jersey drought in the spring of 1911 the early strawberry crop in many sections was completely ruined. The value of this one year's crop would have paid the farmers affected thereby 250 per cent interest on a most expensive spray irrigation system.

The southern states east of Texas and bordering on the Gulf of Mexico and the Atlantic Ocean cover one of the richest areas of undeveloped agricultural wealth in the United States. Nature has blessed this region with long growing seasons and an abundant water supply, which, if evenly distributed, would make this one of the garden spots of the world. The soils of the South are as a rule porous and easily worked, but lack fertility. The fertilizers which are applied to make up for this deficiency often either lie inert during drought or are leached out by torrential rains. The annual rainfall varies with the locality from 45 to 55 inches. This insures an abundant water supply if properly conserved. There are also many artesian basins, where good wells of large capacity can be obtained for irrigation. Florida produces the most delicate fruit and vegetable crops in the dead of northern winter, and the neighboring states can produce as valuable crops in the early spring. Intensive farming usually has been hampered by the uncertainty of the spring rainfall, and irrigation is needed to insure a more constant supply of soil moisture. Rains come in torrential storms, which dissipate their waters in surface run-off. Droughts follow, with intense heat at critical periods of the plant's growth. Over the greater part of this entire region the summers are wet, the winters dry, and the rainfall of the spring and fall months is uncertain.

A combination of irrigation and drainage at Sanford, Florida, has transformed worthless lands into those producing crops of celery valued at $2,000 per acre for one crop. Irrigation of the uplands of this state shows similar results in citrus culture. Irrigation at Albany, Georgia, has made it possible to produce an abundant growth of alfalfa on worn-out cotton lands. The waters of a flowing well near Selma, Alabama, which have been wasted for forty years, have converted portions of a worn-out plantation into a productive garden.

40. DRY FARMING AS A MEANS OF INCREASING OUR AGRICULTURAL PRODUCT[1]

By E. C. CHILCOTT

Several conditions have contributed to the general interest in dry-land farming. The people of the United States have become aware that government lands suitable for ordinary agriculture are almost a

[1] Adapted from "Dry-Land Farming in the Great Plains Area," *Yearbook of the Department of Agriculture*, 1907, pp. 451–68.

thing of the past. With our rapidly increasing population it will soon become necessary to utilize for crop production a large area of the rich arable land of the West which has insufficient rainfall for ordinary agriculture. Then, also, during the last two or three years there has been rather more than the average amount of rainfall over the larger part of the semiarid region, and many people acquainted with present conditions firmly believe that the climate of this region is rapidly becoming more humid. This belief is without foundation in fact, but since this idea is generally held and has become widely advertised it becomes important to emphasize the fact that there is no adequate basis for hoping that the climate of the arid West is undergoing any appreciable change as regards precipitation.

The conquest of the semiarid West, to be successful and to be accomplished without large and costly failures, must be made slowly and by the careful application of definitely ascertained scientific facts. The boundaries of existing settlements may be gradually extended, but any wholesale attempts to colonize large areas of this semiarid land with people accustomed to farming only in humid regions or not accustomed to farming at all must surely result in disastrous failures, and such failures can only hinder the real progress of western development.

Somewhere within the bounds of the Great Plains area (from the ninety-eighth meridian on the east to a contour line east of the Rocky Mountains, marking an altitude of 5,000 feet, on the west) will ultimately be drawn the line which shall represent the western boundary of the great agricultural region known as the Mississippi Valley. Beyond this will be detached areas, but this will be the margin of the continuous area. It is therefore within this Great Plains area that experiments must be conducted that will determine what portions can be used for general dry-land agriculture and what portions can best be utilized for stock raising. Where this industry becomes the predominating one, means must be devised for supplementing the natural grasses of the range with forage plants, either annual or perennial. Cultivated grains imported from foreign countries having a similar climate must here be tested and selected; here also must be carried on extensive experiments in breeding agricultural plants along the lines that will adapt them to the peculiar conditions of soil and climate which here prevail.

The light rainfall of this region is by no means an unmixed evil. It is probably due to this that the soils of this area are of such wonderful fertility. While the scanty rainfall has not tended to produce

a particularly luxuriant growth of vegetation during past ages, it has served to preserve within the soil the products of decomposition of such vegetation as has been produced. It has also assisted in the production of large quantities of those chemical salts upon which plants depend for their nourishment, and the evaporation being in excess of the precipitation, the tendency has been to keep these beneficial salts near the surface instead of having them either carried far below the reach of plant roots by seepage or removed by the excess of water which occurs in more humid countries.

Already methods have been devised and are in practice throughout the area whereby the moisture of the soil can be conserved and crops may be raised under conditions of drought that have in the past proved absolutely prohibitive of agricultural production. The introduction and development of drought-resistant plants is now enabling farmers in many parts of the area to produce crops of grain during years of drought so severe that it would be impossible to raise any of the grains that were originally introduced into the area from the more humid parts of the country. The development of cultural methods, crop rotations, plant adaptation, and farm organization is only just begun, and in time there will be no part of this area that will not be producing much more than at the present time.

The success of dry farming as it is now practiced in the semi arid districts of the Great Plains area depends upon the application in the most thorough manner of the principles of tillage which have been practiced to a greater or less extent for several hundred years. Settlers who came to the more humid portions of the trans-Mississippi region soon discovered that with the fertile and easily tilled soils and abundant rainfall of these districts it was possible to produce crops successfully with much less labor than is usually bestowed upon them in the less-favored portions of the East. This led to very superficial and slovenly methods of tillage. Often the land was plowed only once in several years (and then only to a depth of 3 or 4 inches), the grain being "disked in" upon the unplowed stubble of the previous year's crop. This system became less and less remunerative as the soil became exhausted of organic matter, and the farmers learned by costly experience that even in the more humid portions of the Great Plains some other system of tillage would be necessary in order to maintain the fertility of their farms.

As settlements extended westward into the drier districts the same shiftless methods were used as those at first practiced farther east. A

series of dry years which culminated in the disastrous drought of 1894 not only demonstrated that these methods were unprofitable where the problem of moisture conservation was most important, but it actually served to depopulate a considerable part of the more arid portions of the Great Plains area. Many farmers abandoned their farms, which were sold for taxes and finally fell into the hands of large land companies.

Since 1894 there has been a somewhat regular increase in the annual precipitation throughout the Great Plains area, until in 1905 it reached the highest point recorded by the Weather Bureau, but only very slightly in excess of the precipitation of 1883. This increase in precipitation, which made the agricultural conditions more favorable, together with the demand for cheap farm lands, had the effect of causing these large land companies to exploit what is now generally known as "dry farming."

Many of the settlers had learned by bitter experience that it would be necessary to adopt even more thorough methods of tillage here than had been required in the more humid east. No new discoveries had been made as to the principles or practices of thorough tillage, but it had been learned that thorough tillage was necessary. It has long been known that the loss of moisture from a stubble field left bare by harvesting the crop is greater than at any other time. This is particularly true in the semiarid districts, where the temperature and wind velocity are usually very high at this time of year. In order to avoid this loss of moisture, it is desirable to plow the land as soon as possible after the crop is removed.

Where the annual precipitation is only barely sufficient for the crop it is of the greatest importance that the soil be kept in such condition that it will be able to store as large a proportion of the rain that falls as possible. It is therefore evident that plowing should not only be done as early as is possible in the fall or late summer, but the plowing should be deep enough to afford a reservoir to receive the rains that fall during the autumn and winter following.

If the land is plowed during hot, dry, summer weather and is allowed to lie loosely as it is left by the plow, there will be a great loss of moisture by evaporation. It is therefore necessary thoroughly to compact the soil as soon as possible after plowing.

If rains occur after the plowing and packing have been done they will form a crust upon the surface and the evaporation from the soil will be greatly increased. It is therefore advisable to harrow the

surface with a light harrow after every rain that occurs during the fall, and, in the southern portion of the area, in the winter. In the spring the soil should be thoroughly harrowed until seeded.

Seeding of small grains should be much lighter in the arid districts than in the humid districts. It is probable that as little as one-half bushel of wheat per acre can be profitably used in the drier portions. After the seeding has been done in the spring the land should be harrowed after every rain until the grain has reached the height of 3 or 4 inches. This will tend to conserve the moisture and will also destroy many weeds. The seeding should be done with some kind of a drill that will distribute the seed evenly and deeply and pack the soil around it thoroughly. Various types of press drills are upon the market, nearly all of which give satisfaction.

The practice of alternate cropping and summer fallowing is a common one in the semiarid region. Where this is done the land is kept thoroughly tilled during the year of summer fallow so as to store up the moisture of two years for the use of one crop. The value of this practice of allowing the soil to remain bare during the entire season is questionable, for, though it may serve to give good results for a few years, it must necessarily result in an almost complete destruction of the organic matter in the soil. This will bring about such a physical condition of the soil that it will no longer retain moisture as it did when it contained an abundant supply of organic matter. A much better practice is to raise some kind of legume crop which can be turned under before it becomes hard and woody and while there is still a sufficient amount of moisture in the plants and in the soil to cause rapid decomposition. The physical as well as the chemical composition of the soil will be improved by this practice instead of injured, as is the case where the bare summer tillage is practiced.

It will therefore be seen that dry farming depends upon the utilization of what has long been known, but insufficiently practiced, rather than upon any new discoveries; upon the adaptation of well-known means to a definite end, rather than upon the establishment of any new system. It is the return to time-tested methods of intensive cultivation for the purpose of moisture conservation in place of the shiftless and superficial methods of extensive farming which sprang up upon the rich and easily tilled prairies of the subhumid belt.

How successful these intensive methods will be in overcoming the effects of severe and long-continued drought remains yet to be deter-

mined. As before stated, the exploiting of dry farming on the Great Plains has been carried on during a period of unusually heavy rainfall. In all probability droughts as severe and as long continued will occur in the future as have occurred in the past. Then and not until then, will these methods be subjected to the decisive test. There will always be a borderland where stock raising will be the important industry with farming as a side issue. The actual settler who will give his personal attention to the details of farm work, and who has had sufficient experience in farming under somewhat similar conditions to make him familiar with the general practices required in the semiarid districts, and who has sufficient capital to buy one or two sections of land, to build a house and barn, and to stock the farm with a hundred head of cattle or more, together with the necessary teams, will have a fair chance of success where the settler who owns but a quarter-section of land and has only sufficient capital to buy a team and the necessary farm implements would meet with almost certain failure. It is believed that it must be to this class of well-to-do farmers who will combine stock raising with farming that we must look for the agricultural development of a large portion of the semiarid districts. Companies recently organized for the purpose of carrying on farming operations on a large scale with the use of steam tractors also give some promise of success. It is to be hoped that such companies may prove to be permanently profitable, for it will mean much to the agricultural development of an immense area of very fertile land.

41. THE INTRODUCTION OF DRY-LAND PLANTS[1]

By A. N. HUME and MANLEY CHAMPLIN[2]

Over a vast area of our western states the crop failures during the four-year period 1910–1913 show with great force that we need to increase the list of drought-resistant cereals. As settlers go into the driest upland regions of our western states from the Mexican boundary north to Canada, they find that the staple small grains are less certain than in the moister regions farther east. The farmers give up the struggle to farm in dry regions with the varieties adapted to moist regions, and go back east. The hardy pioneers who remain and keep up the fight see more clearly the need of cultivating varieties of plants

[1] Adapted from *Bulletin 156, South Dakota Agricultural Experiment Station*, pp. 116–22.

[2] The first two paragraphs of this reading are borrowed from *Bulletin 158* of the same station, written by N. E. Hansen.—Editor.

from similar dry climates of the Old World. A giant millet, called proso, and a grain sorghum, called kaoliang, have recently been introduced to meet this need.

In the dry interior desert region north of the Sea of Aral in Turkestan and north into Siberia, proso is a great food staple of the Kirghiz nomads, tent-dwellers in the desert. It is a great advantage to have a grain like proso, that can be sown in the spring after it gets too late for other grains, a grain that will serve as a catch crop and yet ripen early enough to afford a satisfactory yield. The value of proso as a feed for cattle, sheep, and swine has been investigated, and these experiments demonstrate that stock may be fattened ready for the Chicago market without any other grain than proso. That proso may be raised successfully as a field crop in South Dakota has been shown through a number of years by the Agronomy Division of the Station. We now know that a number of varieties of proso may be profitably raised anywhere in the state and are specially suited for the western half. One point in its favor is that the grain may be sown after it is too late to sow wheat, although for the best results it should not be sown too late.

In the western part of Kansas, Oklahoma, and Texas crops known in a general way as grain sorghums have been the mainstay of the settlers. It is indeed doubtful whether the western part of these states could have been permanently settled except by cattlemen had it not been for such crops as kafir and milo.

This being the case, it was but natural that investigators who were on the lookout for crops for the dry regions should desire some sort of a grain sorghum that would do the same thing for the northern part of the Great Plains that kafir and milo had done for the southern part. Some progress was made by selecting the earliest dwarf plants from the kafir and milo, and the resulting varieties, dwarf kafir and dwarf milo, are matured successfully as far north as the southern part of South Dakota. For the principal part of western South Dakota something still earlier was needed. The United States Department of Agriculture learned through its explorers and agents in the Orient of a very early-ripening grain sorghum grown by the people of Manchuria. This crop was known as kaoliang, a word made up of the Chinese *kao* and *liang*, meaning tall or great millet. The Manchurians use the leaves for fodder, the stalks for building and basket material, and the seed for food for themselves and their live stock,

besides distilling a portion of it and making an alcoholic liquor. Since Manchuria lies in approximately the same latitude as South Dakota, and is somewhat similar in climatic conditions, it was thought likely that the kaoliang from there would do well here, and trial lots of seed were furnished to the South Dakota Experiment Station in the spring of 1909 and placed on trial.

The crop grown in this trial was found to be extremely variable. There were tall stalks, short stalks, compact heads, and loose heads. Apparently the native Manchurians had not given much attention to selecting seeds for a uniform type. Thus it became necessary to do considerable selective breeding work before the seed was adapted to general distribution and to machine handling. Selection of the heaviest, most compact heads on stalks of a uniform height was practiced, and selective breeding continued through 1912, 1913, and 1914, until in 1914 it is estimated that kaoliang from these two original selections is growing on 1,000 farms in central and western South Dakota.

Kaoliang, though primarily valuable as a grain crop, may also be properly called a dual-purpose crop. In a five-year trial at Highmore Substation and a three-year trial at Cottonwood Substation it has never failed to mature its seed. The seed is usually ready to be harvested by September 15. At Highmore, the average yield for the five years from 1909 to 1913, inclusive, has been 16.5 bushels from one strain and 13.8 bushels from another. The highest yield was 19.2 bushels in 1910, and the lowest was 10.3 bushels in 1911. The average yield of Minnesota No. 13 yellow dent corn for this same period is 12.6 bushels, showing that the climatic conditions were decidedly severe. At Cottonwood in 1912, kaoliang yielded an average of 23.7 bushels per acre in farm system No. 4 as compared with 22.5 bushels per acre for Minnesota No. 13 corn.

Every season since kaoliang was introduced there have been drouth periods of considerable duration both at Highmore and Cottonwood. The drouth resistance of kaoliang is due partly to its ability to recover rapidly after having remained dormant for a time, which characteristic is common to all grain sorghums, and partly to its low moisture requirements. A trial made at the Akron, Colorado, Substation shows that kaoliang required about one-third as much water to produce a gram of grain as was required by northwestern dent, a very early variety of corn. For producing a gram of grain and forage

about five-sixths as much water was required as for producing the same weight of grain and forage in corn.[1]

42. DRAINAGE AS A MEANS OF RECLAIMING LAND[2]

By SAMUEL H. McCRORY

Back and Jacob swamps are located on the south side of the Lumber River, in Robeson County, North Carolina. The watershed of Back Swamp is about 17 miles long and varies in width from one-half to $2\frac{1}{2}$ miles, and contains 21,550 acres, about one-third of which is under cultivation. Jacob Swamp has a watershed $9\frac{1}{2}$ miles long and varies in width from 1 to 4 miles. Its drainage area contains 9,980 acres, approximately one-fourth of which is cultivated land. Gum and Cotton Mill branches are two small tributaries which empty directly into the river and drain 1,320 acres, about 10 per cent of which is under cultivation.

The natural drainage of nearly all the land in the district is poor. The land on the ridges that can be most easily drained has been cleared and is under cultivation. The lowlands and that in the swamps is still in timber, although in places attempts have been made to clear this land and to farm it. The land will grow fine crops in dry years when conditions are favorable, but in wet years the crops are failures. The greater part of the timberland in the district has such poor drainage that until improved outlets are provided for the drainage it cannot be cleared and cultivated successfully. The cultivated land has almost the same need for drainage as the unimproved. Attempts have been made to drain this land, but on account of the poor outlets for the field ditches it has not been possible to obtain the results desired; nearly every field in the district shows the need of better drainage.

During the rainy season the entire district is wet. The flat character of the watershed makes the movement of the water to the present drainage channels extremely slow; over much of the district the water stands in the low places until it evaporates. The present

[1] The extensive use of alfalfa in the drier sections is made possible by reason of its deep-rooting habit, and much work has been done in the direction of perfecting its drought-resisting qualities. Similarly, durum or macaroni wheat extended the wheat-growing area in semiarid regions. See *Yearbook of the Department of Agriculture*, 1903, pp. 329, etc.—EDITOR.

[2] Adapted from "A Report upon the Back Swamp and Jacob Swamp Drainage District, Robeson County, North Carolina," *Bulletin 246, Office of Experiment Stations, United States Department of Agriculture*, pp. 8–33.

drainage channels, even if cleared, are entirely inadequate to remove the drainage from the district or give a satisfactory outlet for lateral or farm drainage.

Of the total precipitation that falls upon a given tract of land a certain portion is taken up by vegetation, some is removed by evaporation, some sinks into the ground, and some finds its way over the surface into natural or artificial channels and thence into the larger streams. The water removed in the last-mentioned manner is known as run-off; a certain portion of the water that sinks into the ground later appears also as run-off. It is that part of the precipitation which appears as run-off that must be dealt with in reclaiming lands that under natural conditions are perpetual swamps or that are periodically damaged by the overflow of adjoining streams.

The most important factors affecting the rate of run-off from a given watershed are: precipitation; the size, shape, and topography of the watershed; the nature of the soil; the character of the vegetation; and the rate of evaporation. Of these, the most important consideration is precipitation.

The annual rainfall at Lumberton (a station in the immediate vicinity of Back and Jacob swamps) varies from a minimum of 38.43 inches in 1909 to a maximum of 62.76 in 1901. The table of monthly and annual rainfall shows that February, June, July, and August have a normal precipitation exceeding 5 inches per month. The minimum monthly rainfall recorded was 0.28 inch in October, 1896, and the maximum monthly was 12.52 inches in May, 1901. The maximum recorded precipitation in 24 hours occurred September 14 and 15, 1904, when 5.87 inches fell. During 14 years there were 4 days in which there was a precipitation of 4 inches or more and 9 days in which more than 3 inches fell in 24 hours.

Aside from the storms of 1901 and 1908, there are no storm periods that show an average daily precipitation in this region of more than 0.75 of an inch over a long period of time, and as the heaviest storms generally occur in the months from May to September, when conditions are most favorable for the soil to absorb precipitation, and as the soil absorbs water readily and responds quickly to drainage, it was decided that ditches designed to remove a run-off of one-half inch of water in 24 hours from the entire watershed of Back Swamp and three-fourths of an inch of water in 24 hours from the watershed of Jacob Swamp would afford good drainage. The higher rate of run-off assumed for Jacob Swamp is due to the fact that its area is less than

half that of Back Swamp. The size of the upper portions of the main ditch and of the lateral ditches was determined by the requirements of the machinery to be used in their construction; all lateral ditches will remove a run-off of 1 inch or more of water in 24 hours from their watersheds. The ditches are planned to remove this amount of water when the depth is but 5.5 feet, and will remove about 30 per cent more when running bank full.

The improvements recommended are in the nature of straightening and clearing the Lumber River channel, and are estimated to cost about $3,500. The main feature of the improvements, however, is the construction of efficient ditches in the principal drainage channels within the district. These ditches are designed with sufficient capacity to take care of all the water that they may reasonably be expected to be called upon to handle, and they are of sufficient depth to act as outlets for future farm drainage in the district. The ditches are to follow, in general, the natural "runs" of the swamps, but in one or two cases, as, for instance, in Cypress Branch and Jacob Swamp, certain divisions have been made which it is believed will prove advantageous to the construction of the ditches and for the handling of the water.

The toal cost of the recommended improvements, which will make available for cultivation all the land within the district, 32,850 acres, is estimated at $142,621. This gives a cost per acre of $4.34. Since the expenditure recommended may reasonably be expected to more than double the land values of the district, it would seem that the investment should be an attractive one from this standpoint alone.

The work has been planned with a view to permanence and efficiency rather than to cheapness of first cost, but it is not believed that any recommendations have been made that will not be amply justified by results.

NOTE.—Various estimates have been made of the amount of land which might be reclaimed by drainage. Some students place the total area of swamp and overflowed lands of the United States at 80,000,000 acres. This is nearly three times the area of Great Britain and Ireland (see *Senate Document 443*, 60th Congress, 1st session). While this is an important and attractive field of effort, we must not fail to measure the cost of such reclamation works against their future productivity, and compare this with results in other possible lines of agricultural expansion.—EDITOR.

43. UTILIZING PLANTS OF HIGH WATER REQUIREMENTS[1]

By O. W. BARRETT

For many years the lack of a wet-land root crop has been felt throughout the South Atlantic and Gulf states. There is a vast area of semicultivated or uncultivated land in these sections which is too wet to admit of the cultivation of general crops. Some 40,000 acres in the Carolinas and Georgia have been fully abandoned, and at least half as much ground is only planted once in two to four years on account of the decreased profits in rice culture in that region. As a result, efforts have been made to find profitable crops which may be grown in the rich soils of the coast-plain area of both of the sections mentioned which are too wet for profitable potato culture. The recent interest in starch roots, which may be utilized in the production of alcohol as well as for stock feeding, has lent a still greater importance to this question.

There are four types of root crops known as aroids, namely, yautias, alocasias, dasheens, and taros, which promise much in this direction. Though they have been cultivated in the tropics for centuries, they are practically new to the agriculturists of America. However, their crop season is sufficiently short to allow of their maturing in ordinary seasons before the advent of killing frosts.

Many of the varieties are of use as salad plants, though the prime object, especially of the yautia and dasheen varieties, is the production of starch. The tubers of many varieties are suitable for table use, and the roots of nearly all forms may be used as stock food, either fresh or when ground into meal. Those which produce small but numerous tubers are particularly adapted for the production of alcohol.

These crops require only a moderate amount of attention, fertilizers are seldom required, and insect and fungous pests are comparatively few. Yields are heavy, in some cases two to four times the average yield for potatoes. Finally, they are adapted to soils too wet for other root crops, such as sweet potatoes and cassava.

NOTE.—Some other writers are less enthusiastic concerning the possibilities of the aroids. Whatever the event may prove, they represent a significant line of experiment in the utilization of wet lands. The newspapers reported last season that flour was being milled from

[1] Adapted from "Promising Root Crops for the South," *Bulletin 164, Bureau of Plant Industry, United States Department of Agriculture*, pp. 7–8, 28–29.

dasheens grown in Florida, and that the growers were confident of making a commercial success of the venture.

The cranberry has long been used as a reclaimer of bog lands, nearly or quite useless for other crops—18,000 acres in Massachusetts, New Jersey, and Wisconsin. Rice is doubtless the largest user of wet lands in the United States. In Arkansas alone it has aided in bringing 100,000 acres of river-bottom lands into profitable use within the last few years.—EDITOR.

C. Fertility as a Limiting Factor in Agricultural Production

44. CHEMICAL CONTENT AS A MEASURE OF PRODUCTIVE POWER[1]

BY CYRIL G. HOPKINS

In brief, there are ten elementary substances that bear the same relation to the making of crops as brick and mortar bear to a wall of masonry. If any one of these ten elements is entirely lacking, it is impossible to produce a grain of corn or wheat, a spear of grass, or a leaf of clover.

Two elements, carbon and oxygen, are taken into the plant from the air through the leaves; hydrogen is secured from water absorbed by the roots; and iron and sulphur are also supplied by nature in abundance. But the other five elements require careful consideration if lands are to be kept fertile. These are potassium, magnesium, calcium, phosphorus, and nitrogen; and every landowner ought to be as well acquainted with these five elements as he is with his five nearest neighbors.

Instead of making this acquaintance and gaining a knowledge of important facts and principles, the average farmer in the older states, with failing fertility, has made the acquaintance of the fertilizer agent; and instead of purchasing what he needs for the permanent improvement of his soil, he buys what the agent wants to sell, with the common result that the seller is enriched while the soil is merely stimulated to greater poverty.

Potassium.—A careful study of the facts shows that potassium is one of the abundant elements in nature; that the average crust of the earth contains $2\frac{1}{2}$ per cent of this element; and that normal soils bear some relation in composition to the average of the earth's crust. If normal soil had the same percentage, then the plowed soil of an acre

[1] From *Circular No. 167, Agricultural Experiment Station, University of Illinois,* pp. 3–9.

$6\frac{2}{3}$ inches deep (corresponding to 2,000,000 pounds of soil) would contain 50,000 pounds of potassium. In Illinois, the normal soils actually do contain from 25,000 to 45,000 pounds per acre of this plant-food element in the first $6\frac{2}{3}$ inches, while less than 4 pounds of potassium would be added in an application of 200 pounds of the most common commercial fertilizer. The Illinois system of permanent fertility does not provide for the purchase of potassium for normal soils, but it does provide for the liberation of an abundance of that element from the practically inexhaustible supply in the soil. This liberation is accomplished by the action of decaying organic matter plowed under in the form of farm manure or crop residues, including clover or other legumes.

Only where the soil is positively deficient in potassium susceptible of liberation, as is the case with some sand soils and with most peaty swamp lands, need potassium be purchased in permanent systems of either grain farming or live-stock farming; but in market gardening, or in raising timothy hay for the market, commercial potassium may be required, and on some worn soils especially deficient in decaying organic matter the temporary use of kainit is often advisable.

Magnesium and calcium.—As a general average, the normal soils of Illinois contain more than four times as much potassium as magnesium, while the loss by leaching and cropping in rational systems of grain or live-stock farming may be actually greater for magnesium than for potassium, so that magnesium is more apt to become deficient in soils than is potassium.

The calcium supply in normal soils is also only one-fourth that of potassium, while the average loss by cropping and leaching is four times as great, so that 16 to 1 expresses the relative importance of calcium and potassium in the problem of permanent fertility on normal Illinois soils.

All limestones contain calcium; and the common dolomitic limestone in the almost measureless deposits of northern Illinois contains both calcium and magnesium in very suitable form both for plant food and for correcting or preventing soil acidity. In the Illinois system of permanent fertility, ground natural limestone is applied, where needed, at the rate of about 2 tons per acre every four years.

Phosphorus.—Attention was called to the fact that 2,000,000 pounds of the average crust of the earth contains 50,000 pounds of potassium; but compared with this we find only 2,000 pounds of phosphorus. Likewise, the plowed soil of an acre of average Illinois land contains about 35,000 pounds of potassium but less than 1,200

pounds of phosphorus. When grain is sold from the farm, about equal amounts of phosphorus and potassium are carried away, while in independent systems of live-stock farming much more phosphorus than potassium leaves the farm.

With phosphorus at 3 cents a pound, one can double the amount of that element contained in the plowed soil of our $200 land at a cost of $35 an acre, while to double the potassium in the same stratum would cost more than $1,000 an acre.

Phosphorus can be purchased delivered at the farmer's railroad station in Illinois, for about 3 cents a pound in the form of fine-ground natural rock phosphate, for 10 to 12 cents a pound in steamed bone meal, or for 12 to 15 cents in acid phosphate. It can be used with profit in any of these forms, but the data thus far secured in comparative experiments plainly indicate that, with equal amounts of money invested, the natural rock phosphate will give the greatest profit in rational permanent systems. At least 1,000 pounds per acre every four years should be applied, and for the first application even 3 or 4 tons per acre is not considered too much phosphate by those who best understand the need and value of phosphorus on normal Illinois land.

Nitrogen and organic matter.—There is a rather common opinion that the growing of clover enriches the soil in nitrogen, and many people even believe that clover in crop rotation will maintain the fertility of the soil. Such opinions are largely erroneous. The mere growing of clover on normal land does not enrich it. Even the nitrogen is not increased unless the clover crop is returned to the soil, either directly or in farm manure. Rotation with such crops as corn, oats, and clover depletes the soil of all important elements of fertility, and on normal soils always results ultimately in land ruin unless some system of restoration is practiced. Clover takes large amounts of calcium and phosphorus from the soil, and does not increase the nitrogen content if only the roots and stubble are left, because they contain no more nitrogen than the clover itself will take from soils of normal productive power.

To increase or maintain the nitrogen and organic matter of the soil is the greatest practical problem in American agriculture. In an hour's time one can spread enough limestone or phosphate on an acre of land to provide for large crops of wheat, corn, oats, and clover for ten or twenty years, while to supply the nitrogen for the same length of time would require from 20 to 40 tons of clover or from 80 to 160 tons of farm manure to be added to the same acre of land even though one of the four crops harvested secured its nitrogen from the air.

Certainly we are making no such additions to the soil in average Illinois agriculture, and one may well ask, How then is it possible to grow the crops now produced in this state? In the simplest language the answer to this question is: By "skimming" the soil, by working the land for all that's in it, by following the example of our ancestors, who brought agricultural ruin to millions of acres of once fertile farm land in the original thirteen states.

To provide nitrogen, I would suggest a five-field system—a four-year rotation of corn, corn, oats, and clover grown upon four fields for five years, while the fifth field is kept in alfalfa. At the end of the fifth year the alfalfa field is brought into the rotation and one of the other four fields seeded to alfalfa for another five-year period, and so on. If the yields are 50 bushels each of corn and oats, 2 tons of clover, and 3 tons of alfalfa; if the straw and half the cornstalks are used for bedding and all the other produce for feed; and if 60 per cent of the nitrogen in the manure is used for the production of crops, then a system is provided which will permanently maintain the supply of nitrogen. This is for the live-stock farmer.

For the farmer who sells grain and hay, a 25-bushel wheat crop may well be substituted for the first corn crop, clover being seeded on the wheat for plowing under the next year before planting corn. If the fall and spring growths of this clover aggregate $1\frac{1}{2}$ tons, and if only the grain and clover seed and the alfalfa hay are sold, all clover, stalks, and straw being returned to the land, this also provides a system for the permanent maintenance of nitrogen.

These systems should be considered as only suggesting the basis for solving the nitrogen problem. The important point is that the landowner should know the essential facts and base his practice upon them in order to provide for permanent fertility with respect to the three elements, nitrogen, phosphorus, and limestone.

45. PHYSICAL FACTORS DETERMINING THE AGRICULTURAL QUALITY OF LAND[1]

By EDWARD J. RUSSELL

The complex that we speak of as the soil consists of four parts:

1. The mineral matter derived from rock material, which constitutes the framework of the soil and is in the main unalterable, but it contains some reactive decomposition products.

[1] Adapted from *Soil Conditions and Plant Growth* (new edition), pp. 53–113. (Longmans, Green, & Co., London. Used by permission of the publishers.)

2. The calcium carbonate and phosphate (the latter being usually in much smaller amounts), and organic matter derived from marine or other organisms deposited simultaneously with the soil.

3. The soil water, a dilute solution of carbonic acid containing small quantities of any soluble soil constituent.

4. The residues of plants that have grown since the soil occupied its present position, consisting of the mineral plant food taken up from the soil water and of part of the complex organic matter. As the source of energy this may be regarded as the distinguishing characteristic of soils.

By the method of mechanical analysis the particles of soil can be sorted out into fractions, each falling within certain specified limits of diameter; those adopted in Great Britain are as follows:

Fine gravel	Above 1 mm.	in diameter
Coarse sand	1 to 0.2 mm.	" "
Fine sand	0.2 to 0.04 mm.	" "
Silt	0.04 to 0.01 mm.	" "
Fine silt	0.01 to 0.002 mm.	" "
Clay	Below 0.002 mm.	" "

So far as is known, all coarser particles are chemically inert. The clay fraction, on the other hand, stands out in sharp contrast, both in composition and in chemical and physical properties.

The clay fraction.—Clay may be regarded as a plastic colloid, but its special properties are seen only when a certain amount of water is present. If it is well rubbed with water it becomes very sticky and absolutely impervious to air or water; it is also highly plastic. It shrinks very much on drying and absorbs heat; on moistening again, however, there is a considerable swelling and evolution of heat. The separate particles of clay are so small that, when placed in water, they sink only very slowly, in spite of their high specific gravity. Small quantities of acids or salts cause the temporary loss of plasticity, impermeability, and the property of remaining long suspended in water without settling; the clay is now said to be flocculated. The change can be watched if a small quantity of any flocculating substance is added to the turbid liquid obtained by shaking clay with water; the minute particles are then seen to unite to larger aggregates, which settle, leaving the liquid clear. There is, however, no permanent change; deflocculation takes place and the original properties return as soon as the flocculating agent is washed away. Alkalies

(caustic soda, caustic potash, ammonia, and their carbonates) deflocculate clay, causing it to remain suspended in water for long periods.

These clay properties are of great importance to the fertility of the soil, and no constituent is more necessary in proper proportions, or more harmful in excess. Clay impedes the movement of water in the soil and keeps it in the surface layers within reach of the plant roots. Excess of clay, however, interferes too much with the water movements; it also impedes the movement of air to the roots and lowers the temperature of the soil. The adhesive properties of clay cause the soil particles to bind together into those aggregates on which "tilth" depends; soil without clay would be very like a sand heap. Here also, however, excess of clay does harm and makes the soil so adhesive that it sticks to the tillage implements and retards their movements; it also tends to form large clods unfavorable to vegetation and to make the soil shrink very much on drying, so that large cracks appear in the fields in summertime. These harmful effects are reduced by flocculation effected by dressings of lime or chalk and by organic matter; on the other hand, they are intensified by the deflocculation resulting from the use of alkaline manures. Further, clay "fixes" and retains the ammonia and potash supplied as manure.

Fine silt has also great water-holding powers, and in excessive amounts (above 10 to 15 per cent) it increases the difficulty of working the soil, especially if much clay is present. It does not possess the marked plastic and colloidal properties of clay and is less altered by lime; indeed, no method is known for making it tractable. The coarser grade of silt appears to be very valuable, and constitutes 30 to 40 per cent of many of the loams most famous in the southeast of England for carrying their crops well and not drying out. Probably silt plays a very important part in maintaining the even conditions of moisture so desirable for plant growth. It is fine enough to retard, but not to prevent, percolation, and it facilitates capillary movement of water.

Fine sand forms a considerable fraction—usually 10 to 30 per cent or more—of nearly all soils. Although its dimensions are relatively large, it still possesses cohesiveness and a tendency to cake together; it has not, however, so great an effect as silt in maintaining a good moist condition. Soils containing 40 per cent or more of fine sand tend to form, after rain, a hard crust on the surface, through which young plants can make their way only with difficulty until it has been

broken by a roller. But they have no great water-holding capacity or retentive power, and are not infrequently described by their cultivators as hungry soils that cannot stand drought.

Coarse sand is perhaps the most variable of all soil constituents in amount, and, as its properties are in many ways the reverse of those of clay, it exercises a very great effect in determining soil fertility. Through its lack of cohesion it keeps the soil open and friable; in moderate amounts it facilitates working, but in excess it increases drainage and evaporation so much as to interfere seriously with the water-holding capacity of the soil. Many good loams contain less than 4 per cent and, in general, strong or tenacious soils contain less coarse sand than one-half the quantity of clay present. As the amount of coarse sand increases, the soils become less and less suited to cultivation, till finally the sand-dune condition is reached.

Fine gravel is not usually present to any great extent, and is of importance only when the coarse sand is already dangerously high. Stones, if uniformly scattered through a stiff soil, are on the whole beneficial, because they facilitate tillage. Where they form a bed underlying the soil they may do harm by causing overdrainage.

Calcium carbonate.—Calcium carbonate is often present in small amounts only, but it plays a controlling part in soil fertility. It produces physical as well as chemical effects; it gives rise to the soluble bicarbonate that flocculates clay, and thus physically improves the soil texture. Two soils similar in constitution and general external conditions, temperature, water supply, etc., have very different agricultural value because of their different content of calcium carbonate, one being readily cultivated while the other is wet and sticky and suitable only to pasture land.

The soil water.—The soil retains by absorption and surface attractions some 10 to 20 per cent of its weight of water, distributed as films over its particles. The rain water falling on the soil immediately begins to soak in, but during its passage a certain amount is retained on the surface of the particles and never drains away; it forms a series of continuous films exhibiting all the special properties associated with the surfaces of liquids. Thus, the water remains on the particles against the force of gravity. Further, it tends to distribute itself evenly throughout a uniform mass of soil by moving from places where the curvature of the films is flat to places where the curvature is sharp. Evaporation is continually reducing the thickness of the films, and finally breaks them altogether, so that the soil becomes dry.

The moisture content of a soil is a function of its structure. A sandy soil soon becomes wet, but dries again rapidly. Its large pores allow rapid percolation of the free water; its relatively small total surface (a consequence of the large size of its particles) holds a proportionately small amount of water; it possesses but little colloidal material to absorb and retain water. Addition of easily decomposable organic matter increases the amount of colloid and thus increases the water-holding capacity; addition of clay increases the colloids and the total surface, and also partially blocks up the pores, the last two effects being due to the smallness of the clay particles. Under equal conditions of water supply, clay soils and soils rich in organic matter are, therefore, much moister than sandy soils.

The whole of the soil water is not generally available for any one plant. Water must be supplied to the plant at least as quickly as it is lost by transpiration; otherwise, wilting sets in. Now the rate of supply of soil water is simply the speed at which water can move in the soil, and this depends on the amounts of clay and colloidal matter present; it may easily fall below what is wanted for maintaining equilibrium in the plants growing on soils rich in clay or organic matter. Wilting is so difficult to characterize, and is affected by so many external circumstances, that in any case it affords only a rough method of studying the "availability" of the soil water for the plant.

Organic matter.—The distinguishing characteristic of soil is that it contains part of the complex material synthesized by plants. This material affords energy to numerous micro-organisms, and is gradually converted by them into simple substances appropriate for plant nutrition. In addition, it has important physical effects on the soil. Two great groups are to be carefully distinguished: one furnished by recent generations of plants, the other deposited with soil during its formation and therefore as old as the soil itself. The organic matter furnished by recent vegetation may roughly be classified as: (1) material that has not yet had time to decompose and still retains its definite cell structure; (2) partially decomposed and still decomposing material; (3) simple soluble decomposition products; (4) plant or animal constituents not decomposable in the soil.

The partially decomposed material forms a particularly vague and indefinite group, but one extremely important to plant growth. This group possesses at least six properties not shown by the undecomposed plant residues:

1. It gives a dark brown or black color to the soil.

2. It can withdraw various ions—NH_4, K, PO_4—from their solutions.

3. It causes the soil to puff up or "ferment," and so leads to an increase in the pore space and a marked improvement in the tilth and general mechanical condition.

4. It increases the water-holding capacity of the soil.

5. It swells when wetted.

6. Although the group is essentially transitional, it has a certain degree of permanency and only slowly disappears from the soil.

The group of substances possessing these properties is generally called "humus," and so long as the word is used in a collective sense as a convenient label it may be retained. But the practice has been responsible for a good deal of loose thinking, because it obscures the fact that the group is an indefinite and complex mixture, and gives instead the impression that it is a single definite substance.

The constitution of the soil.—The components of the soil do not form a mere casual mixture. A much more intimate mingling prevails, amounting almost to a loose state of combination. It is unfortunate that so little is known about the compound particles, because they play a great part in determining the relationships between soil and plant growth. They can be disintegrated by various cultivation methods, such as plowing the soil when wet, or by allowing the stock of organic matter and calcium carbonate to fall too low, and when this has happened the "clay" properties become emphasized, so that the soil loses its fine, crumbly state and is very apt to become sticky when wet, and to dry into a hard cake through which young plants can force their way only with difficulty. The compound particles can be re-formed by careful cultivation and by adequate additions of organic matter and calcium carbonate, but the process may take years, nor can it be hastened until it is better understood.

The reader cannot fail to have noticed how many of the important soil properties are due to colloids. The formation of these compound particles, the absorption of soluble manures, the retention of water (in part), the swelling of the soil when wet and its shrinkage when dry, are all colloidal phenomena. If we regard the mineral particles as the skeleton of the soil, we must look upon the colloids as clothing it in many of its essential attributes.

Air supply and temperature of the soil.—The percentage of the volume of a soil which is occupied by air is perpetually varying inversely as the amount of water varies. While the yield of a crop

normally rises as the water increases up to a certain point, it then falls off, because the excess of water reduces the air supply for the roots. Changes in the amount of water in the soil would alone lead to a renewal of the air supply in the soil, but other factors—diffusion, changes in pressure, air movements, etc.—come in, making the gaseous interchange still more complete.

The temperature of the surface layer of soil, which in turn determines the temperatures of the lower layers, is the resultant of several different effects. The actual amount of heat reaching the surface is that portion of the sun's rays that passes unabsorbed through the atmosphere, and is therefore dependent on the climate. The intensity of distribution of the heat over the surface depends on the slope of the land, and is greater the more nearly the land lies at right angles to the midday rays: thus, in our latitudes a south slope is warmer than a north slope, so much as often to produce marked vegetation differences. Many of the rays may be intercepted by vegetation; consequently land densely covered by plants is cooler and moister than bare land. Of the rays that do finally reach the surface not all are absorbed, an unknown fraction being reflected back again into space. Although no actual measurements have been made, the loss from this cause is probably greater on a white chalky soil than on a black humous soil.

The extent to which a given quantity of absorbed heat raises the temperature of a soil depends on its specific heat, and this again on its water content. A dry soil will attain a higher temperature than a moist one. It commonly happens that the surface layer of the soil is hotter than the air, especially on a sunny day. The passage of heat through the soil is slow and consequently fluctuations in temperature at a depth of 3 inches are less marked than at the surface, especially in dry, loose soils. The thermal conductivity of a soil is increased by moistening and by compacting.

46. BACTERIA AND SOIL FERTILITY[1]

By P. E. BROWN

The factors which bring about the change of insoluble substances into soluble in the soil may be grouped into three classes—physical, chemical, and bacteriological. The bacteriological factors have come

[1] Adapted from "Bacteria and Soil Fertility," *Circular No. 7, Agricultural Experiment Station of Iowa State College*, pp. 3–15.

into prominence only quite recently, but now they are recognized to be of as much, if not more, importance than the other two groups.

All bacteria may be included in one of two large classes, depending on their functions or the character of their activities. These are the parasites and the saphrophytes. The saphrophytes are the decay-producers. These saphrophytic, or decay, bacteria are invaluable. They have been called the "link between the world of the living and the dead." They transform dead materials back into living matter and thus complete the cycles through which, in nature, all substances must go.

Enormous numbers of bacteria inhabit the soil, some of them harmful, but the vast majority beneficial. Actual counts have shown that the numbers present in soils may vary from a few thousand per gram (about one-thirtieth of an ounce) to over fifty million per gram. The growth of bacteria in the soil is greatly influenced by certain chemical and physical conditions. Thus, a proper amount of water in the soil is as necessary for the growth of bacteria as for crops. Either excessive moisture or severe drought interferes with bacterial growth very considerably. Temperature conditions are also important. Every organism grows best at a certain temperature, which is called its optimum temperature. The optimum for most soil organisms ranges from 65° to 90° F., although of course there are exceptions to this statement.

In general it may be said that the beneficial bacteria in the soil need air. Hence in heavy clay soils, where there is not enough air, methods which increase the circulation of oxygen in the soil increase bacterial activity; these increase the solution of plant food, and this ultimately increases crop production. On the other hand, if there is too much air present, as in light sandy soils, the bacterial activities will be too great and the humus will be burned up too rapidly, plant food will be produced in too large quantities to be utilized by the crops, and more or less extensive losses of valuable soil elements will occur.

The reaction of a soil (i.e., its relative acidity or alkalinity) means much from a bacterial standpoint. Soils which have become acid or sour are notably unproductive and this is largely due to the fact that the growth of beneficial bacteria in such soils is checked.

Lastly, bacteria require food for growth just as truly as do crops, and it is because of this need that they influence fertility. In the process of taking up food from the chemical compounds in the soil,

the bacteria cause changes in the compounds, making them soluble and hence available for the growth of plants. Most soil bacteria live principally on organic matter, or humus, and the products of their own activity. Up to a certain limit, increasing the humus content may, therefore, be expected to increase the bacterial life. The bacteria, furthermore, not only act on the humus or organic matter in the soil and bring about its solution in the process of obtaining their food, but they also attack the mineral portion of the soil and change insoluble portions of that into soluble.

The nitrogen problem and its solution.—Soils are very apt to be deficient in nitrogen. This element, then, is generally the limiting factor in the growth of crops. Formerly the lack of nitrogen in a soil was supplied by application of nitrate of soda, which was obtained from the nitrate beds in Chile. With the increasing demands for nitrates, the amounts taken yearly from the nitrate beds were enormous, and it was estimated that in a very short time the deposits would be exhausted and the world would face a nitrogen famine. Of course, other nitrogenous materials were available for manure, but in such small amounts that they would be merely a drop in the bucket in supplying the demands of the world.

It was just at this crucial time that soil bacteriologists came to the rescue and quieted the general fears by showing that certain species of bacteria living in soils have the ability to draw upon the inexhaustible supply of nitrogen in the air (which contains 79 per cent nitrogen) and fix it in the soil in a form available for plants. Thus the nitrogen problem was solved and there need be no fear of a nitrogen famine.

There are two classes of bacteria which are thus able to utilize the nitrogen of the air in their growth: first, those which live entirely dependent on their own resources, and second, those which grow on the roots of legumes, such as clover, alfalfa, etc. The first are said to live non-symbiotically, or independently, and are known as non-symbiotic; the second are said to live in symbiosis with the legumes, or in a state of mutual helpfulness, and are called symbiotic.

The first group of nitrogen fixers, or azotobacter, as they are called, are present in most soils. These bacteria fix nitrogen in amounts which have been estimated at from 15 to 40 pounds per acre per year under ordinary conditions. Proper farm management includes many practices which encourage the fixation of nitrogen from the atmosphere. Thus the ordinary operations of tillage, which open

up the soil and admit of a free circulation of air, encourage the growth of the free-living bacteria and bring about greater fixation of nitrogen from the atmosphere. So, also, liming as a remedy for acidity increases the amount of nitrogen in the soil by causing a greater growth of azotobacter.

The beneficial effect of clover growing on soils was known many years before it was satisfactorily explained. The mystery was not cleared up until the bacteriologists found that certain bacteria were associated with legumes and that these bacteria took nitrogen from the air and fixed it in the soil.

Legumes will grow and flourish on soils that have absolutely no nitrogen if the proper bacteria are present and the legumes become *inoculated* with these bacteria. In this process of inoculation the bacteria enter the roots of the legumes. The plants aid the process by a softening of their tissue, and then in so-called "infection-threads" the bacteria pass from cell to cell. They gather at a particular spot and, nourished by the plant, multiply to a large extent and form what are known as *nodules*, or swellings on the roots. As soon as the organisms begin to multiply they begin to take nitrogen from the atmosphere and to supply it to the plant. The plant in return supplies the bacteria with the necessary carbonaceous food and a close union for mutual benefit is thereby established. So the legumes draw but a small proportion of their nitrogen from the soil, and if the entire crop is turned under for a green manure, which is a common practice, there is a large gain to the soil in nitrogen.

Legumes will often grow without inoculation and in soils very rich in nitrogen will yield good crops. They then draw their entire nourishment from the soil. When that is the case the legumes have no advantage over the non-leguminous crop. But when legumes are inoculated they contain a larger percentage of nitrogen and the soil is not robbed of its stock of nitrogen.

The activities of soil bacteria with regard to the nitrogen problem are important, not only from the standpoint of increasing the nitrogen content of soils through additions from the atmosphere, but also in the change of organic materials into available forms. Plant and animal remains in the soil, farmyard manure, green manures, or other organic materials, added to the soil contain insoluble organic nitrogenous matter known as protein, and these must be changed into soluble nitrates to be of use to plants. This solution is accomplished by the process of decay. Bacteria are the active agents bringing

about this decay in the soil. Various groups of universally distributed organisms are involved. In the first place, the insoluble proteins are changed into soluble peptones; these are changed into amino acids, and these in turn to ammonia. This ammonification constitutes a vital stage in the production of nitrates in the soil. It is important also in that it brings about the formation and later the destruction of humus.

Humus is decaying organic matter in the soil. We know that the presence of a proper amount of humus and also the best rate of destruction are important factors from the physical and chemical standpoint in determining the fertility of a soil. Introduction of barnyard manure brings about vastly increased bacterial action, due to the large amount of organic matter added and also the large number of bacteria introduced. Thus the ammonifying power of a soil is increased by addition of manure.

Ammonium compounds produced in the soil as just described never accumulate to any appreciable extent, but are transformed into nitrates almost as rapidly as they are formed. This transformation is called *nitrification* and includes two stages: the change of ammonia to *nitrites* and then the oxidation of nitrites to *nitrates*. Two distinct classes of organisms are involved in the process and they are both of practically universal distribution.

All the farming operations which increase ammonification have a similar effect on nitrification, since nitrification starts where ammonification leaves off. Particularly necessary for nitrification, however, is the presence of lime in soils. This is due to the fact that nitrous and nitric acids are produced in the process of nitrification and if they are not neutralized by lime they accumulate and very quickly stop bacterial action. The activities of both the ammonifying and the nitrifying bacteria are governed very closely by the climatic and farming conditions with regard to moisture, temperature, acidity, aëration, and food supply.

Bacteria and minerals in the soil.—In the process of decay of which we have spoken, the destruction of the organic nitrogenous materials leads to the production of other compounds than ammonia and nitrates. Chief among these is *carbon dioxide*. Furthermore, the organic non-nitrogenous substances, such as starches, sugars, cellulose, etc., are destroyed in the general decay which occurs in the organic matter, and among the variety of products which result we find various organic acids and particularly carbon dioxide. These organic acids and

the carbon dioxide have the power of attacking insoluble mineral compounds in the soil and transforming them into soluble forms, available for plant food. Thus insoluble phosphates and potash compounds are acted upon and changed into soluble forms by the soil water carrying the carbon dioxide and organic acids in solution. Again we see that bacterial activities bring about the preparation of plant food.

The demands of various crops for sulphur has been the subject of recent investigations and it has been estimated that the supply of sulphates in the soil may be insufficient in many cases for the proper feeding of certain crops. A group of organisms occurring in the soil and known as the *sulphur bacteria* come into prominence here as the agency keeping up the proper supply of sulphates. When proteins decay, hydrogen sulphide gas is set free. This is taken up by the sulphur bacteria and oxidized to free sulphur, which is in turn oxidized to sulphates. Increased decay therefore leads to increased hydrogen sulphide and this in turn to increased sulphates for plant food.

We may conclude, therefore, that all methods which increase the activities of the decay bacteria lead directly to an increased supply of available nitrogen, and indirectly to larger amounts of phosphorus, potassium, and sulphur becoming available for plant food.

In short, the relation between bacteria and soil fertility is very close and very vital, and systems of permanent agriculture must rest firmly on a bacteriological basis to be of any value. If chemical analyses have shown sufficient amounts of the necessary mineral plant food constituents, the bacteria under the optimum conditions which can be maintained by any intelligent farmer will transform it into an available form to satisfy the needs of the growing crops.

47. THE REAL MEANING OF SOIL FERTILITY AND SOIL EXHAUSTION[1]

By EDWARD J. RUSSELL

Fertility is not an absolute property of soils, but has meaning only in relation to particular plants. Plant requirements vary; a soil may be fertile for one plant and not for another; every soil might conceivably prove fertile for something. But in practice the agriculturist can find use for only a very limited number of plants; he therefore has to select those combining the double features of salability in his

[1] From *Soil Conditions and Plant Growth* (new edition), pp. 150–52. (Longmans, Green, & Co., London. Used by permission of the publishers.)

markets and suitability to his conditions of soil and climate. To a certain extent it is possible to bridge the gap between plant requirements and soil conditions; the former may be permanently altered by breeding if suitable plants cannot be found by selection, and the latter may be changed by such processes as draining, liming, etc. When all has been done that is economically possible there may still remain a divergency between the conditions ideal for the plant and those it finds in the soil; this divergency is the measure of the infertility of the soil for the crop.

The problem has to be simplified by restricting attention to the common agricultural crops and interpreting fertility to mean the capacity for producing heavy crops regardless of any subtle distinctions of quality. Three factors then come into play: an adequate supply of air and water to the roots, a sufficiently rapid production or solution of food material, and absence of harmful agencies. We have seen that the compound particles can be altered considerably by human efforts, within the limits fixed by the properties of the unalterable ultimate particles. In trying to improve the soil, therefore, four courses are open:

1. The water supply may be increased by deepening the soil, e.g., by breaking a "pan," by enriching the lower spit, or other device, while the air supply can be increased by drainage.

2. The compound particles may be built up by proper cultivation and the addition of organic matter (e.g., dung, green manuring, etc:) and of calcium carbonate.

3. Sufficient calcium carbonate must be added for the needs of the crop and the micro-organisms; nothing but a field trial can determine what this is.

4. The food supply can be increased by the addition of fertilizers, the plowing-in of green leguminous crops, feeding cake on the land, etc.

Conversely, the "exhaustion" of soil is limited in our climate (England) to the removal of organic matter, calcium carbonate, and some of the food (often the nitrogen compounds), and the desirable compound particles; the ultimate particles, and all the possibilities they stand for, remain untouched. A distinction is therefore made between the temporary fertility or "condition" within the cultivator's control and the "inherent" fertility that depends on the unalterable ultimate particles. Of course the distinction is very indefinite and, in practice, wholly empirical, no proper method of estimation having

yet been worked out, but it is of importance in compensation and valuation cases.

Serious soil exhaustion did not arise under the old agricultural conditions where people practically lived on the land and no great amount of material had to be sold away from the land. Phosphate exhaustion was the most serious occurrence, and as the original supplies were not as a rule very great, it must have been acute by the end of the eighteenth century in England, where remarkable improvements were, and still are, effected all over the country by adding phosphates. The crowding of the population into cities, and the enormous cheapening of transport rates, led during the nineteenth century to the adoption in new countries, particularly in North America, of what is perhaps the most wasteful method of farming known—continuous arable cultivation without periodical spells of leguminous and grass crops. The organic matter was rapidly oxidized away, leaching and erosion increased considerably when the cover of vegetation was removed, while the compound particles that had slowly been forming through the ages soon broke down. Nothing was returned to the soil, the grains and other portable products were sold and the straw burnt. The result has been a rate of exhaustion unparalleled in older countries, and wholly beyond the farmer's power to remedy; consequently he left the land and moved on. The excellent experimental studies of Hopkins at the Illinois Experiment Station, of Whitson at Wisconsin, and other American investigators have shown that additions of lime, of phosphates, and sometimes of potassium salts, with the introduction of rotations, including grass and leguminous crops, and proper cultivation, will slowly bring about a very marked improvement.

D. Topographical Limitations to Agriculture

48. SOIL EROSION[1]

By R. O. E. DAVIS

Destruction of the natural growth and clean cultivation on hilly land, without protection against erosion, results in the removal of the soil material by water more rapidly than it is formed and in a very

[1] Adapted from "Soil Erosion in the South," *Bulletin 180, United States Department of Agriculture*, pp. 9–23. Part of the first paragraph is borrowed from an article by the same author in *Yearbook of the Department of Agriculture*, 1913, p. 208.

irregular manner. Hillside erosion is not a simple process, for in it are involved the relation of the velocity of moving water to the slope of the soil, the amount of organic matter incorporated in the soil, the vegetal covering, the mechanical composition of the soil, and the rate at which water is supplied to the surface. In addition to the surface conditions of the soil, the character of the subsoil has a profound effect upon the tendency to erode. The fact that a soil is or is not covered with forest or grass, or contains much organic matter, or is clayey or sandy, influences the rate at which it absorbs water and the amount of erosion caused by the surface run-off of the water.

The erosion of the soil occurs mainly in two ways, which are markedly different: (1) as sheet erosion and (2) as the gully type of erosion. In sheet erosion the water falling on the surface of the soil carries off with it a small amount of soil material from every part of the field. In advanced stages there appear incipient gullies, parallel to each other, known as shoestring gullies. This type of erosion is not so destructive of the field on which it occurs as the gully type, for the removal is more uniform, and if a field is continually cultivated the physical evidence of erosion may be slight. The second type of erosion, or the gullying, develops where, owing to the occurrence of natural depressions, the water runs off in the form of streams. These cut into the soil and soon develop gulches of great depth with nearly vertical sides, which grow in length, breadth, and depth with every rain. This type of erosion is the most difficult to check, and renders the land on which it occurs practically valueless.

Excessive erosion results in a change in the physical condition of the soil. The bodily removal of soil particles takes place from the surface; there is a sorting of the soil particles, the larger and heavier being deposited first and the smallest last. The result is an impaired physical condition of the soil wherever this sorting action is taking place. Soils composed almost entirely of either sand or clay particles are not so good as those with a fair amount of each.

The quality of the soil is greatly impaired by the continual process of erosion. Rapid leaching takes place, removing a large part of the soluble salts; the surface soil is often washed down to the lowlands and sometimes out to the sea; gullying so defaces the land that it becomes difficult to cultivate. The organic matter is one of the first losses of eroded soils. Abandonment of the field follows, because the land is considered too poor for agricultural use, having lost its productiveness through the process of erosion.

The gullies in the field act as drainage ditches. The land between such gullies drains too rapidly, the water-table is lowered, and it is difficult for the crop to obtain sufficient water for proper growth or to withstand even a moderate period of drought. As these gullies occur on hillsides, the natural drainage is ample, if not excessive, so that the additional drainage furnished by the gullies is a positive disadvantage.

This removal of the best soil material and the impairment of that remaining results in the occurrence of much waste land. In the South the abandonment of land is traceable more often to erosion than to any other cause. In some of the states vast areas, amounting occasionally to 50 per cent of the arable land of those sections, have been abandoned to the ravages of water-wash.

Throughout the South erosion is probably worse than in other sections of the country. In the Atlantic Coast states the worst type is encountered in the Piedmont section. It is less marked in the mountains, probably because agriculture is less extensively practiced. Erosion is very marked in some of the states of the Mississippi Valley, some of the worst eroded sections of the country occurring in the hills of these states.

The erosion in the Piedmont province is apparently more pronounced in the more southerly states. This is probably due largely to the climatic conditions. During the winter the temperature is not low enough to cause deep freezing, and cold periods are of short duration. The soil is not protected from the action of winter rains like the soil of more northerly climates, where the soil is frozen during practically the entire winter, so that the rain cannot remove the soil mantle. In addition, the precipitation in more northerly regions is largely in the form of snow, which melts gradually in the spring and is absorbed by the soil instead of running off over the surface.

One of the peculiar soil conditions encountered in many sections and most conducive to destructive erosion is a surface layer of heavy soil material, varying from 6 inches to several feet in thickness, underlain by sandy material. Erosion on this type of soil produces enormous gulches, 10–50 feet deep and several hundred feet wide, sometimes extending for 1 or 2 miles. They begin in the hills adjoining the low lands, and by constant undercutting and caving push far back into the hills. They are very difficult to stop and often work their way across roadways, farms, forests, and even building sites. It is problematical whether the progress of these gulches can be en-

tirely checked in any profitable way. However, it may be greatly retarded by continually dumping débris, brush, or other material into the gully, by planting wild honeysuckle around the head and sides and young pines or other trees in the mouth.

The main problem is to arouse the farmers to a realization of the importance of treating their soil in the manner best suited to its condition. Soils that cannot be cultivated without danger of erosion should be used for the production of hay, for pasture, or for forestry, either of which may pay better under the circumstances than the crops obtained from clean cultivation. The greatest damage from erosion generally occurs where the original growth has been removed and the land is being used for crop production. This most frequently means clean culture. The agricultural conditions in the South are especially favorable for erosion, as the main crop is cotton, which requires entire freedom from grasses and weeds. It often happens that the same land is cropped year after year to cotton, until the soil becomes so unproductive that its cultivation is not profitable, and is allowed to "lie out" and become infested with weeds. It is then that erosion is most destructive. The soil is exhausted of organic matter, and even before the weeds begin to grow the rains form gullies over the surface. Probably the field will not be put under cultivation again, and in a few years it becomes devastated, without agricultural value, and a menace to the surrounding land.

The reclamation of eroded land is possible, but requires attention and patience. The use of such land for forestry is commonly advisable.

49. GRAZING WHERE TILLAGE IS IMPRACTICABLE[1]

By JAMES STEPHENSON, JR.

The grazing lands of the state of Idaho constitute by far the largest portion of its area. A very large portion of the acreage classified as timbered is also grazing land and is occupied as a summer range by sheep and cattle. There are wide areas in the northern section of the state that are covered with rough hills and mountains, the south sides of which are valuable grazing land and the north sides heavily timbered. It is therefore safe to say that Idaho contains 30,000,000 acres of grazing land. A large portion of the land of the southern district

[1] Adapted from *Bulletin 216, Office of Experiment Stations, United States Department of Agriculture*, p. 24.

is suitable for winter grazing only, being largely covered with a heavy growth of sagebrush and dry-land grasses, but without a supply of water for stock during the summer months. The melting snows and spring rains supply the needed moisture to produce a good growth of grass over all of this region, but the lack of water for stock saves the grass and forage until the snowfall of winter provides the needed moisture for cattle and sheep, and the grass then provides the winter feed for thousands of animals. During the summer months stock of all kinds seek the green grass and pure spring water of the high mountain ranges with which the state is so liberally provided. Grass and forage in the mountains, when the snowfall is deep, grow rapidly and provide great quantities of feed year after year on the same range.

NOTE.—This is merely a typical bit of what is true over considerable areas in our highland regions, both east and west. New England land that was too rough for the plow reverted to sheep pastures and horse farms as soon as the competition of western lands became active. Similarly, New York has become our leading dairy state, and from the Adirondacks south to Alabama the rough lands of the Appalachian region are destined apparently to produce, at least for a long time to come, only such product as can be secured from pastoral farming. Of course, in many places orcharding competes with or supplements stock raising and, as population becomes more dense, there is a strong tendency to introduce more intensive types of farming on the small plateaus or in even the tiniest of level valleys. There is also the tendency to carry agriculture farther by resorting to terracing as a means of extending permanent cultivation to the less level lands. Among the teeming population of the Orient this effort is carried to the extreme, and terraced hillsides whose natural slope is nearly or quite forty-five degrees are cultivated in narrow strips by hand labor. Travelers report that some of the rice-paddies are but a few feet in diameter.

An interesting phase of pastoral farming in a mountainous region is to be seen in Switzerland. The peasants maintain their permanent homes in the valleys, where they stable and feed their stock through the winter, often combining some light form of household manufactures with their other tasks during the indoor season. With the advent of spring, flocks and herds are driven into the foothills or *Voralp*, and after a few weeks up to the *Hochalp*, as far as the margin of perpetual snow. From this summer grazing they return to the *Voralp* for a few weeks in the fall and then are driven down to the valleys for winter housing.

It is evident that an additional reason why cattle or sheep raising is peculiarly suited to hilly regions is due to the fact that the product may be driven to market or the output reduced to a compact form, such as cheese or butter, which is easily transported. Other and more intensive ways of utilizing such mountain or piedmont lands are precluded by the difficulties which such regions present to the extension of good roads, railways, or other means of communication. The Cumberland Plateau furnishes a striking illustration of this point.—EDITOR.

50. TREE CROPS FOR THE HILL LANDS[1]

BY J. RUSSELL SMITH

As a consequence of rocks and hills, large areas of the United States are utterly unplowable and practically useless, except for forest possibilities. Other large areas are of low fertility, low productivity, and difficult to work because they are hilly and somewhat stony, and have therefore been run down and robbed. We have not yet learned how to unlock one-half our agricultural resources. Agriculture depends upon plants, and plants depend upon heat, light, fertility, and moisture. Now we have added to those four the purely unnatural and complicating fifth qualification—suitability of the land to be plowed and to stand continued plowing. Let us keep the plow, but cease to depend upon it so completely.

There stands abandoned New England, a chaos of stones, rocks, hills, an unending amazement to the natives of the good agricultural districts of America. "How," these people are continually saying, "how in the world did the Yankees of past generations ever wring a living from among those rocks?" As long as agriculture was a matter of plowing, it is no wonder that the New Englanders fled the land until farms by thousands were gladly to be given away if you would only pay a fraction of the value of the buildings. Shall the American people be baffled merely because we cannot plow the land when it has all the other qualifications—heat, light, moisture, and fertility?

There are Spanish acorns two inches long and, except for some shortage of protein, surprisingly close to white bread in food content. In Spain thousands of acres are given over to acorn orchards which fatten tens of thousands of Iberian hogs without the intervention of the labor of man in harvesting. The crop of the chestnut orchards which occupy the steep, rocky, untillable mountainsides of Italy is

[1] Adapted from "The Agriculture of the Future," *Harpers Magazine*, January, 1913, pp. 273–80.

the bread supply and the money crop of thousands of mountain-dwellers. Over some hundreds of thousands of square miles of territory below Mason and Dixon's line the 'possum waxes fat on the toothsome, nutritious fruit of the persimmon tree. In Japan and China the persimmon has been improved until it is as large as a peach and is an article of diet as fresh, dried, and preserved fruit. At the present time we leave most of our eastern nuts to grow, fall, and waste. But the plant-breeder tells us that it is only a matter of time and patience to make, by repeated crosses, a good crop-yielding hickory tree. We may have almost an ideal hickory nut with the delicious, sweet flavor of the shellbark, the thin shell of the Kentucky nut, and enough of the size of the Indiana giant to put it in the English-walnut class so far as food value, accessibility, and desirability are concerned.

For New England the point of the discussion is this: these trees, these engines of production, do not depend upon the plow. They can wedge their trunks in between the rocks, send their roots far down into the glacial subsoil, rear their spreading branches out into the clouds, rain, sunshine, and produce. What care they for rocks? If there is earth among them, the tree roots will find it. If the rocks encumber the surface, they merely serve as a mulch to keep in the moisture.

What New England needs is an intelligent agriculture that is adjusted to her resources. The agriculture of New England came from Old England, Old England got it from the Romans, the Romans got it from the Egyptians, and the Egyptians got it from the Nomad's wife. There is nothing like a good old ancestry, but possibly we have overdone it a bit in our farming. New England, like all hilly and rocky countries, has a greater need for a tree-crop agriculture than it has for any other thing in the whole list of relations between man and nature. With the proper improved varieties of tree crops there is no reason why Massachusetts might not, square mile for square mile, produce as many fat pigs or fat sheep or fat turkeys as Kansas. The proper succession of fruiting mulberries, chestnuts, walnuts, pecans, hickories, shagbarks, filberts, and many other tree crops that might be introduced from this and other lands would give one continuous succession of workless harvests to which the pigs, sheep, and turkeys could walk and eat. Then those small sections of the land that are fit for tillage could be tilled to the limit, *intensively*, to fill in the gaps. A sugar-maple orchard of selected and improved varieties would, of course, yield much more than the present scrub maple orchards of

the North. In fact, it is probable that there are enough varieties of tree crops now in existence and fairly well proved to make the rocky Massachusetts tree farm yield income to match the $150 per acre land of the Illinois or Kansas farm.

E. The Law of Diminishing Returns from Land

51. THE CLASSIC STATEMENT OF DIMINISHING RETURNS[1] By DAVID RICARDO

If all land had the same properties, if it were unlimited in quantity and uniform in quality, no charge could be made for its use unless where it possessed peculiar advantages of situation. It is only, then, because land is not unlimited in quantity and uniform in quality, and because in the progress of population land of an inferior quality, or less advantageously situated, is called into cultivation, that rent is ever paid for the use of the original and indestructible powers of the soil. With every step in the progress of society which shall oblige a country to have recourse to land of a worse quality (second or third degrees of fertility) to enable it to raise its supply of food, rent on all the more fertile land will rise.

It often, and, indeed, commonly, happens that before No. 2, 3, 4, or 5, or the inferior lands are cultivated, capital can be employed more productively on those lands which are already in cultivation. It may perhaps be found that by doubling the original capital employed on No. 1, though the product will not be doubled, will not be increased by 100 quarters, it may be increased by 85 quarters, and that this quantity exceeds what could be obtained by employing the same capital on land No. 3.

If, then, good land existed in a quantity much more abundant than the production of food for an increasing population required, or if capital could be indefinitely employed without a diminished return on the old land, there could be no rise of rent; for rent invariably proceeds from the employment of an additional quantity of labor with a proportionally less return. The most fertile, and most favorably situated, land will be first cultivated, and the exchangeable value of its produce will be adjusted in the same manner as the exchangeable value of all other commodities, by the total quantity of labor necessary in various forms from first to last to produce it and bring it to

[1] Adapted from *Principles of Political Economy and Taxation* (Bohn edition), pp. 44–49.

market. When land of an inferior quality is taken into cultivation, the exchangeable value of raw produce will rise, because more labor is required to produce it.

52. EXTENSIVE AND INTENSIVE MARGINS OF CULTIVATION[1]

By HENRY ROGERS SEAGER

To give precision to the statement of the law of diminishing returns it is customary to distinguish between the "extensive" and the "intensive" margins of cultivation. If, for example, the demand for corn increases so as to induce the production of a larger crop, the additional supply may come from either or both of two sources. Corn-growers in the settled portions of the country may make their farming more *intensive;* that is, apply more labor and capital to the cultivation of each acre and in this way add to their crops. Others may be induced to take up new land and prepare it hastily for *extensive* farming. If both results follow the prospect for a somewhat higher price for corn, as they would if farmers were always alert to their own interests and able to adapt their methods promptly to changing market conditions, there will be two situations in which the expenses of producing corn are just covered by the price. The corn grown on the poorest land hastily plowed and planted, or on the *extensive margin of cultivation*, will barely repay the expenses of production. So also will the additional corn raised by the application of additional labor and capital at the *intensive margin of cultivation.* The producer at either margin may in such a case be properly described as the *marginal producer*, whose expenses of production are just covered by the price of the product. The fact that his *additional* corn just about pays for itself will not, of course, prevent the farmer at the intensive margin from realizing a rent from that corn which he continues to produce at smaller proportionate expense.

53. THE LAW OF DIMINISHING RETURNS ELABORATED AND QUALIFIED[2]

By JOHN STUART MILL

Land differs from the other elements of production, labor, and capital in not being susceptible of indefinite increase. Its extent is limited, and the extent of the more productive kinds of it more

[1] Adapted from *Principles of Economics*, p. 130. (Copyright by Henry Holt & Co.)

[2] Adapted from *Principles of Political Economy*, Book I, chap. xii.

limited still. It is also evident that the quantity of produce capable of being raised on any given piece of land is not indefinite. This limited quantity of land, and limited productiveness of it, are the real limits to the increase of production. Such limitation is not, however, like the obstacle opposed by a wall, which stands immovable in one particular spot, and offers no hindrance to motion short of stopping it entirely. We may rather compare it to a highly elastic and extensible band, which is hardly ever so violently stretched that it could not possibly be stretched any more, yet the pressure of which is felt long before the final limit is reached, and felt more severely the nearer that limit is approached.

After a certain, and not very advanced, stage in the progress of agriculture, it is the law of production from the land that, in any given state of agricultural skill and knowledge, by increasing the labor the produce is not increased in an equal degree; or, to express the same thing in other words, every increase of produce is obtained by a more than proportional increase in the application of labor to the land. This general law of agricultural industry is the most important proposition in political economy. The most fundamental errors which still prevail on our subject result from not perceiving this law at work underneath the more superficial agencies on which attention fixes itself.

When, for the purpose of raising an increase of produce, recourse is had to inferior land, it is evident that, so far, the produce does not increase in the same proportion with the labor. The very meaning of inferior land is land which with equal labor returns a smaller amount of produce. Land may be inferior either in fertility or in situation. The one requires a greater proportional amount of labor for growing the produce, the other for carrying it to market. If the land A yields a thousand quarters of wheat to a given outlay of wages, manure, etc., and in order to raise another thousand recourse must be had to the land B, which is either less fertile or more distant from the market, the two thousand will cost more than twice as much labor as the original thousand, and the produce of agriculture will be increased in a less ratio than the labor employed in procuring it.

Instead of cultivating the land B, it would be possible, by higher cultivation, to make the land A produce more. It might be plowed or harrowed twice instead of once; it might be oftener or more thoroughly weeded; more elaborate implements might be used in its cultivation; a greater quantity or more expensive kinds of manure might be applied, or when applied they might be more carefully mixed and

incorporated with the soil. These are some of the modes by which the same land may be made to yield a greater produce; and when a greater produce must be had, some of these are among the means usually employed for obtaining it. But, that it is obtained at a more than proportional increase of expense is evident from the fact that inferior lands are cultivated. Inferior lands, or lands at a greater distance from the market, of course yield an inferior return, and an increasing demand cannot be supplied from them unless at an augmentation of cost, and therefore of price. If the additional demand could continue to be supplied from the superior lands by applying additional labor and capital, at no greater proportional cost than that at which they yield the quantity first demanded of them, the owners or farmers of those lands could undersell all others, and engross the whole market. Lands of a lower degree of fertility, or in a more remote situation, might indeed be cultivated by their proprietors for the sake of subsistence or independence; but it never could be the interest of anyone to farm them for profit. That a profit can be made from them sufficient to attract capital to such an investment is a proof that cultivation on the more eligible lands has reached a point beyond which any greater application of labor and capital would yield, at the best, no greater return than can be obtained at the same expense from less fertile or less favorably situated lands.

The principle which has now been stated must be received, no doubt, with certain explanations and limitations. Even after the land is so highly cultivated that the mere application of additional labor, or of an additional amount of ordinary dressing, would yield no return proportioned to the expense, it may still happen that the application of a much greater additional labor and capital to improving the soil itself, by draining or permanent manures, would be as liberally remunerated by the produce as any portion of the labor and capital already employed. It would sometimes be much more amply remunerated. But even when such works had been accomplished, much would undoubtedly continue to be produced under less advantageous conditions, and with a smaller proportional return, than that obtained from the best soils and situations. And in proportion as the further increase of population required a still greater addition to the supply, the general law would resume its course, and the further augmentation would be obtained at a more than proportionate expense of labor and capital.

There is, however, another agency, in habitual antagonism to the law of diminishing return from land. For this I use the somewhat vague and general expression "progress of civilization," because the things to be included are so various that hardly any term of a more restricted signification would comprehend them all.

Of these, the most obvious is the progress of agricultural knowledge, skill, and invention. Improved processes of agriculture are of two kinds: some enable the land to yield a greater absolute produce, without an equivalent increase of labor; others have not the power of increasing the produce, but have that of diminishing the labor and expense by which it is obtained. Among the first are to be reckoned the disuse of fallows, by means of the rotation of crops and the introduction of new articles of cultivation capable of entering advantageously into the rotation. These improvements operate, not only by enabling the land to produce a crop every year instead of remaining idle one year in every two or three to renovate its powers, but also by direct increase of its productiveness, since the great addition made to the number of cattle by the increase of their food affords more abundant manure to fertilize the corn lands.

Next in order comes the introduction of new articles of food containing a greater amount of sustenance, like the potato, or more productive species or varieties of the same plant, such as the Swedish turnip. In the same class of improvements must be placed a better knowledge of the properties of manures, and of the most effectual modes of applying them; the introduction of new and more powerful fertilizing agents, such as guano, and the conversion to the same purpose of substances previously wasted; inventions like subsoil-ploughing or tile-draining; improvements in the breed or feed of laboring cattle; and the like. Improvements which diminish labor, but without increasing the capacity of the land to produce, are such as the improved construction of tools; the introduction of new instruments which spare manual labor, as the winnowing and threshing machines; a more skilful and economical application of muscular exertion, such as the introduction, so slowly accomplished in England, of Scotch ploughing, with two horses abreast and one man instead of three or four horses in a team and two men, etc.

Analogous in effect to this second class of agricultural improvements are improved means of communication. Good roads are equivalent to good tools. It is of no consequence whether the economy of labor takes place in extracting the produce from the soil

or in conveying it to the place where it is to be consumed; not to say, in addition, that the labor of cultivation itself is diminished by whatever lessens the cost of bringing manure from a distance, or facilitates the many operations of transport from place to place which occur within the bounds of the farm. Railways and canals are virtually a diminution of the cost of production of all things sent to market by them; and literally so of all those things the appliances and aids for producing which they serve to transmit. By their means land can be cultivated which would not otherwise have remunerated the cultivators without a rise of price.

From similar considerations, it appears that many purely mechanical improvements, which have, apparently at least, no peculiar connection with agriculture, nevertheless enable a given amount of food to be obtained with a smaller expenditure of labor. A great improvement in the process of melting iron would tend to cheapen agricultural implements, diminish the cost of railroads, of wagons and carts, ships, and perhaps buildings; and would hence diminish the cost of food. The same effect would follow from better application of wind or water power, engineering inventions useful in drainage, etc.

Likewise, improvements in government, and almost every kind of moral and social advancement, operate in the same manner to counteract the law of diminishing return to agricultural labor. Suppose a country in the condition of France before the Revolution; the removal of a fiscal burden on agriculture, such as tithe, has the same effect as if the labor necessary for obtaining the existing produce were suddenly reduced one-tenth. The abolition of corn laws, or of any other restrictions which prevent commodities from being produced where the cost of their production is lowest, amounts to a vast improvement in production. It is well known what has been the effect in England of badly administered poor laws, and the still worse effect in Ireland of a bad system of tenancy, in rendering agricultural labor slack and ineffective. No improvements operate more directly upon the productiveness of labor than those in the tenure of farms and in the laws relating to landed property. Above all, the acquisition of a permanent interest in the soil by the cultivators of it is as real and great an improvement in production as the invention of the spinning jenny or the steam engine.

We may say the same of improvements in education. The intelligence of the workman is a most important element in the productiveness of labor. To look no farther than the most obvious phenomena,

the backwardness of French agriculture in the precise points in which benefit might be expected from the influence of an educated class is partly accounted for by the exclusive devotion of the richer landed proprietors to town interests and town pleasures.

54. SCIENTIFIC RESEARCH AS A MEANS OF INCREASING AGRICULTURAL PRODUCTION[1]

By M. B. WAITE

The real reason why science, and particularly chemistry and the biological sciences, have in the past been of so little use to the farmer is because the science itself was weak. Only fragmentary, isolated facts had been worked out; only a few of its principles had been discovered. Bacteria had been known and described to some extent since the days of Ehrenberg (1830). It remained for Pasteur, in 1862, to prove that they were the real cause and not the result of fermentation. He discovered the first bacterial disease, a silk-worm disease, in 1870. A year or two later he proved that anthrax of cattle was caused by a bacillus. Burrill, in 1878, discovered that pear blight was caused by bacteria, the first discovery of a bacterial plant disease. Koch discovered the germ of tuberculosis in 1884. Since that time there has been a continual stream of new and important discoveries in bacteriology of immediate and practical benefit to agriculture.

The fungous diseases of plants have been known and described for one hundred and fifty years. The number has been added to continually until it runs up into the thousands. Many single species of both cultivated and native plants have from fifty to one hundred fungous enemies attacking them. Not until Millardet discovered the efficacy of Bordeaux mixture in the control of the vine mildew in 1883 and published his results in 1885 did we have a satisfactory and direct way of killing these fungous enemies or preventing their attack on the host plant. A new word, "fungicide," had to be added to the dictionary.

Chemistry has done great things for agriculture. It has furnished the methods of fertilizing the soil and of securing these fertilizers from the earth—potash, phosphoric acid, and nitrogen. It has

[1] Adapted from "The Importance of Research as a Means of Increasing Agricultural Production," *The Annals*, LIX (May, 1915, on "America's Industrial Opportunity"), 41–50.

helped us in compounding a balanced, complete fertilizer, varying to suit soil conditions and crops. Chemistry, combined with plant-breeding methods, has increased the sugar content of sugar beets by furnishing a method for determining the high sugar content of certain specimens to be used for seed production. It furnishes the basis of much agricultural experimentation and assists in nearly all lines of research.

The science of zoölogy has contributed much information of use to agriculture. Perhaps in no way has it been more useful than through the researches on the diseases of domestic animals and the methods of controlling or mitigating these diseases. The science of entomology, likewise, has been of the utmost utility to farmers in crop production in recent years. Economic entomology may be said to date back for at least two generations. The control of insect pests is perhaps one of the greatest contributions of science to the farmer. A few striking examples may be used to illustrate the success that has been achieved in this line.

About forty years ago the potato bug or Colorado potato beetle started in to simply eat up or clean up the potato crop of this country. The entomologists readily fixed up a poison to kill him. The codling moth or apple worm was thought by many to originate spontaneously within the fruit. The entomologists have taught us that it is the larva of a harmless-looking little gray moth. They have worked out the life-history of the insect and have given us a spraying routine with arsenical poisons by which practically complete control is maintained. The Hessian fly has been known to destroy half or two-thirds of the wheat crop in the wheat-growing districts. The problem was attacked by the entomologists and the life-history of the insect fully worked out, with the result that a practical, satisfactory remedy was developed, the utilization of which entails no additional expense to the farmer. The remedy consists merely in deferring the planting of the wheat until after the emergence and death of the adult flies. The cotton-boll weevil entered this country from Mexico about twelve years ago and its effects were so severe that it threatened the destruction of the entire cotton industry of the United States. Scientific entomologists attacked the problem vigorously and by means of a thorough investigation of the life-history and habits of this pest found a way of getting around it.

Previous to 1885, the farmer, fruit-grower, or gardener was practically at the mercy of the fungous pests on his crops. The losses are

still very large. It has been estimated that all plant production in this country is annually reduced from 20 per cent to 25 per cent through plant diseases, and there is considerable foundation for this estimate. When we realize that we are dealing with a crop worth annually between six and seven billion dollars on the farm, the magnitude of this loss is appalling. Only a part of this can, of course, ever be reached and prevented. Many diseases are physiological, produced by the effect of climatic and soil conditions difficult or impossible to change. In the irrigated regions of the West, new types of physiological diseases have caused serious troubles in the orchards of deciduous fruits and in the orange groves. It may take years of careful research to even find out the cause of some of these troubles, and they appear to be difficult to remedy even when the cause is thoroughly known.

On the other hand, the fungous diseases of plants have yielded to research during the last thirty years in a manner which is really marvelous. The black rot of the grape, a native disease on American grapevines, attacked our rapidly increasing grape industry in the eastern United States in the early eighties. The Department of Agriculture at Washington started experiments in 1886 and within the next four or five years gave to the grape-growers a complete and successful routine treatment by spraying through which from 95 per cent to 98 per cent of the crop could be saved. This treatment is the very basis of the grape industry. Without it the vines would bear only ragged and unsightly bunches scarcely fit for shipping to market.

I should not, however, convey the idea that all plant diseases have been brought under control. Many problems, like the crown gall of fruit and other trees, the root rots, the new citrus canker, and numerous others, still attack vegetation unchecked, or only partly controlled, or, in case of the citrus canker, controlled by heroic methods, such as burning up the entire tree when only a single leaf is affected.

I have mentioned earlier in this paper chemical investigations of the soil. At first, that was thought to be the important problem in soil studies. Later it was shown that the physical properties of the soil were as important, or possibly more important, than its chemical composition. Still later, within the last twenty years, it has been realized by investigators that the biological properties of the soil are even more important than either its chemical or its physical properties. The soil under our feet is teeming with bacteria, with fungi, with

algae, and with microscopic animal life, chiefly nematodes. The species of the latter alone run up into the thousands. This branch of science has only been entered upon. It may be scarcely said to have been exploited at all. It is no exaggeration to say that a cubic foot of ordinary garden soil presents more unsolved problems in biology than the entire solved problems up to the present time, and these problems are more difficult than the building of the Panama Canal, including both its engineering and its biological achievements; more difficult than wireless telegraphy, than submarine or aerial navigation, for these latter have in part been solved. If we may judge the future from the past, while great things may be expected from soil bacteriology and soil biology during the next hundred years, at the end of that period new problems just as important will be clamoring for solution.

One strikingly important thing has already been brought out in soil bacteriology. In this case the discoveries are partly linked with plant physiological discoveries. I refer to the nitrogen-assimilating organisms in the root tubercles of the Leguminosae. It has been known for over a hundred years that clovers and some similarly related plants possess a remarkable power in renewing soil fertility when these plants are plowed under for the growing of subsequent crops. It was finally discovered that this property depended on the presence of minute tubers or tubercles that occur abundantly on the roots and that the real function was performed by a tiny bacillus which lives in these tubercles. The bacteria living in the tubercles are able to force the free nitrogen of the air into chemical combinations and build up nitrates subsequently readily converted into proteids, the most valuable food of both plants and animals. Still later investigations have developed practical methods of cultivating and distributing these germs for soil inoculation.

F. The Conservation of Nature's Agricultural Resources

55. THE DEMAND FOR CONSERVATION OF THE LAND[1]

By JAMES J. HILL

How are we caring for the soil, and what possibilities does it hold out to the people of future support? We are only beginning to feel the pressure upon the land. The whole interior of this continent,

[1] Adapted from *The Natural Wealth of the Land and Its Conservation*, address at the Conference of the Governors of the United States, 1908, pp. 67–71.

aggregating more than 500,000,000 acres, has been occupied by settlers within the last fifty years. What is there left for the next fifty years? Excluding arid and irrigable areas, the latter limited by nature, and barely enough of which could be made habitable in each year to furnish a farm for each immigrant family, we have only 50,000,000 acres of surveyed and 36,500,000 acres of unsurveyed land as our actual remaining stock. And 21,000,000 acres were disposed of in 1907. How long will the remainder last? No longer can we say that "Uncle Sam has land enough to give us all a farm."

Equally threatening is the change in quality. There are two ways in which the productive power of the earth is lessened: first by erosion and the sweeping away of the fertile surface into streams and thence to the sea, and second by exhaustion through wrong methods of cultivation. The former process has gone far. Thousands of acres in the East and South have been made unfit for tillage. North Carolina was, a century ago, one of the greatest agricultural states of the country and one of the wealthiest. Today as you ride through the South you see everywhere land gullied by torrential rains; red and yellow claybanks exposed where once were fertile fields; and agriculture reduced because its main support has been washed away. Millions of acres, in places to the extent of one-tenth of the entire arable area, have been so injured that no industry and no care can restore them.

Far more ruinous, because universal and continuing in its effects, is the process of soil exhaustion. It is creeping over the land from East to West. The abandoned farms that are now the playthings of the city's rich or the game preserves of patrons of sport bear witness to the melancholy change. New Hampshire, Vermont, northern New York, show long lists of them. In western Massachusetts, which once supported a flourishing agriculture, farm properties are now for sale for half the cost of the improvements. Professor Carver, of Harvard, has declared after a personal examination of the country that "agriculture as an independent industry, able in itself to support a community, does not exist in the hilly parts of New England."

The same process of deterioration is affecting the farm lands of western New York, Ohio, and Indiana. Where prices of farm lands should rise by increase of population, in many places they are falling. Between 1880 and 1900 the land values of Ohio shrank $60,000,000. Official investigation of two counties in central New York disclosed a condition of agricultural decay. In one, land was for sale for about

the cost of improvements, and 150 vacant houses were counted in a limited area; in the other, the population in 1905 was nearly 4,000 less than it was in 1855.

Practically identical soil conditions exist in Maryland and Virginia, where lands sell at from $10 to $30 an acre. In a hearing before an industrial commission, the chief of the Bureau of Soils of the Department of Agriculture said: "One of the most important causes of deterioration, and I think I should put this first of all, is the method and system of agriculture that prevails throughout these states. Unquestionably the soil has been abused." The richest region of the West is no more exempt than New England or the South. The soil of the West is being reduced in agricultural potency by exactly the same processes which have driven the farmer of the East, with all his advantage of nearness to markets, practically from the field.

Within the last forty years a great part of the richest land in the country has been brought under cultivation. We should, therefore, in the same time have raised proportionately the yield of our principal crops per acre, because the yield of old lands, if properly treated, tends to increase rather than to diminish. The year 1906 was one of large crops and can scarcely be taken as a standard. We produced, for example, more corn that year than had ever been grown in the United States in a single year before. But the average yield per acre was less than it was in 1872. We are barely keeping the acre-product stationary. The average wheat crop of the country now ranges from 12½ bushels in ordinary years to 15 bushels per acre in the best seasons. And so it is on down the line.

But the fact of soil waste becomes startlingly evident when we examine the record of some states where single cropping and other agricultural abuses have been prevalent. Take the case of wheat, the mainstay of single-crop abuse. Many of us can remember when New York was the great wheat-producing state of the Union. The average yield of wheat per acre in New York for the last ten years was about 18 bushels. For the first five years of that ten-year period it was 18.4 bushels, and for the last five years 17.4 bushels. Farther west, Kansas takes high rank as a wheat-producer. Its average yield per acre for the last ten years was 14.16 bushels. For the first five of those years it was 15.14, and for the last five years 13.18. Up in the Northwest, Minnesota wheat has made a name all over the world. Her average yield per acre for the same ten years was 12.96 bushels. For the first five years it was 13.12, and for the last five 12.8. We

perceive here the working of a uniform law, independent of location, of soil, or of climate. It is the law of a diminishing return due to soil destruction. Apply this to the country at large, and it reduces agriculture to the condition of a bank whose depositors are steadily drawing out more money than they put in.

What is true in this instance is true of our agriculture as a whole. In no other important country in the world, with the exception of Russia, is the industry that must be the foundation of every state at so low an ebb as in our own. According to the last census the average annual product per acre of the farms of the whole United States was worth $11.38. It is little more than a respectable rental in communities where the soil is properly cared for and made to give a reasonable return for cultivation. There were but two states in the Union whose total value of farm products was over $30 per acre of improved land. The great state of Illinois gave but $12.48, and Minnesota showed only $8.74. No discrimination attaches to these figures, where all are so much at fault. Nature has given to us the most valuable possession ever committed to man. It can never be duplicated, because there is none like it upon the face of the earth. And we are racking and impoverishing it exactly as we are felling the forests and rifling the mines. Our soil, once the envy of every other country, the attraction which draws millions of immigrants across the seas, gave an average yield for the whole United States during the ten years beginning with 1896 of 13.5 bushels of wheat per acre. Austria and Hungary each produced over 17 bushels of wheat per acre, France 19.8, Germany 27.6, and the United Kingdom 32.2 bushels per acre. For the same decade our average yield of oats was less than 30 bushels, while Germany produced 46 and Great Britain 42. For barley the figures are 25 against 33 and 34.6; for rye 15.4 against 24 for Germany and 26 for Ireland. In the United Kingdom, Belgium, the Netherlands, and Denmark a yield of more than 30 bushels of wheat per acre has been the average for the past five years.

When the most fertile land in the world produces so much less than that of poorer quality elsewhere, and this low yield shows a tendency toward steady decline, the situation becomes clear. We are robbing the soil in an effort to get the largest cash returns from each acre of ground in the shortest possible time and with the least possible labor.

In all parts of the United States, with only isolated exceptions, the system of tillage has been to select the crop which would bring in most

money at the current market rate, to plant that year after year, and to move on to virgin fields as soon as the old farm rebelled by lowering the quality and quantity of its return. It is still the practice, although diversification of industry and the rotation of crops have been urged for nearly a century and are today taught in every agricultural college in this country. We frequently hear it said that the reduction in yield is due to the wearing out of the soil, as if it was a garment to be destroyed by the wearing. The fact is that soils either increase or maintain their productivity indefinitely under proper cultivation. If the earth, the great mother of human and animal life, is to "wear out," what is to become of the race?

56. A DEFENSE OF THE PIONEER[1]

By F. A. WALKER

The American people, finding themselves on a continent containing an almost limitless breadth of arable land of fair average fertility, having little accumulated capital and many urgent occasions for every unit of labor power they could exert, have elected—and in doing so they are, I make bold to say, fully justified on sound economical principles—to regard the land as practically of no value and labor as of high value; have, in pursuance of this theory of the case, systematically cropped their fields on the principle of obtaining the largest crops with the least expenditure of labor, limiting their improvements to what was required for the immediate purpose specified, and caring little about returning to the soil any equivalent for the properties taken from it by the crops of each successive year. What has been returned has been only the manure generated incidentally to the support of the live stock needed to work the farm. In that which is for the time the great wheat and corn region of the United States, the fields are, as a rule, cropped continuously, without fertilization, year after year, decade after decade, until their fertility sensibly declines.

Decline under this regimen it must, sooner or later, later or sooner, according to the crop and according to the degree of original strength in the soil. Resort must then be had to new fields of virgin freshness, which with us in the United States has always meant "the West." When Professor Johnston wrote, the granary of the continent had

[1] Adapted from "American Agriculture," Tenth Census of the United States (1880), Vol. III, "Agriculture," pp. xxx–xxxiii.

already moved from the flats of the Upper St. Lawrence to the Mississippi Valley, the north-and-south line which divided the wheat product of the United States into two equal parts being approximately the line of the eighty-second meridian. In 1860 it was the eighty-fifth; in 1870, the eighty-eighth; in 1880, the eighty-ninth.

Meanwhile, what becomes of the regions over which this shadow of partial exhaustion passes like an eclipse in its westward movement? The answer is to be read in the condition of New England today. A part of the agricultural population is maintained in raising upon limited soils the smaller crops, garden vegetables and orchard fruits, and producing butter, milk, poultry, and eggs for the supply of the cities and manufacturing towns which had their origin in the flourishing days of agriculture, which have grown with the age of the communities in which they were planted, and which, having been well founded, when the decadence of agriculture begins flourish the more on this account, inasmuch as a second part of the agricultural population, not choosing to follow the westward movement of the grain culture, is ready with its rising sons and daughters to enter the mill and the factory.

Still another part of the agricultural population gradually becomes occupied in the higher and more careful culture of the cereal crops on the better portion of the former breadth of arable land, the less eligible fields being allowed to spring up in brush and wood; deeper plowing and better drainage are resorted to; fertilizers are now employed to bring up and keep up the pristine fertility of the soil.

And thus begins the serious systematic agriculture of an old state. Something is done in wheat, but not much. New York raised 13,000,000 bushels in 1850; thirty years later, when her population has increased 70 per cent, she raises 13,000,000 bushels. Pennsylvania raised 15,500,000 bushels in 1850, with a population of 2,250,000; in 1880, with 4,500,000 inhabitants, she raised 19,500,000 bushels. New Jersey raised 1,600,000 bushels then; she raises 1,900,000 now.

More is done in corn, that magnificent and most prolific cereal; more still in buckwheat, barley, oats, and rye. Pennsylvania, though the tenth state in wheat production, stands first of all the Union in rye, second in buckwheat, and third in oats; New York, the same New York whose Mohawk and Genesee valleys were a proverb through the world forty years ago, is but the thirteenth state in wheat, but is first in buckwheat, second in barley, and third in rye.

It is in the way described that Americans have dealt with the soil opened to them by treaty or by purchase. And I have no hesitation in saying that posterity will decide, first, that it was both economically justifiable and politically fortunate that this should be done; and, secondly, that what has been done was accomplished with singular enterprise, prudence, patience, intelligence, and skill.

It will appear, from what has been said under the preceding titles, that I entertain a somewhat exalted opinion concerning American agriculture. Indeed, I do. To me the achievements of those who in this new land have dealt with the soil, under the conditions so hurriedly and imperfectly recited, surpass the achievements of mankind in any other field of economic effort. With the labor power and capital power which we have had to expend during the past one hundred years, to have taken from the ground these hundreds, these thousands of millions of tons of food, fiber, and fuel for man's uses, leaving the soil no more exhausted than we find it today; and, meantime, to have built up, out of the current profits of this primitive agriculture, such a stupendous fund of permanent improvements, in provision for future needs and in preparation for a more advanced industry and a higher tillage—this certainly seems to me not only beyond the achievement, but beyond the power, of any other race of men.

So much in retrospect. Let us now turn to the future.

As we cast our eyes over the broad surface of the United States, it might seem that our people had, as yet, little more than commenced the occupation of their patrimonial estate. The wholly unsettled area of the United States, as shown by the census of 1880, amounted to about 1,400,000 square miles, being nearly one-half of the area of the country. But, notwithstanding the imposing total of 1,400,000 square miles of still unsettled territory, the amount of land available for occupation for ordinary agriculture is not large. The Public Land Commission, in its report of 1880, says: "It was estimated, June 30, 1879, that (exclusive of certain lands in southern states) of lands over which the survey and disposition laws had been extended, lying in the West, the United States did not own, of arable agricultural public lands, which could be cultivated without irrigation or other artificial appliances, more than the area of the present state of Ohio, viz., 25,576,960 acres."

It is, indeed, an astonishing announcement that the public land system, so far as relates to agricultural settlers, has virtually come to an end; that the homestead and pre-emption acts are practically

exhausted of their contents. However, the situation described is not so serious as might be thought. Vast quantities of land which have passed out of the hands of the government, through patents to states, to schools and colleges, to railways, etc., have not yet come under cultivation and occupation. Other large quantities are in the hands of private owners, who have never cultivated them, or, at least, have not done so *bona fide*, having taken them speculatively and kept up a merely formal compliance with the requirements of the law. Considerable additions to the public lands may also be expected from the reduction of Indian reservations, as the tribes concerned take up small lots in severalty and cede the remainder to the United States. Some parts of the extensive mineral and coal lands, withdrawn from the scope of the general land law, will unquestionably be found to have an agricultural value; and the surface will be worked for one kind of wealth while the recesses beneath are searched for another. It is, moreover, not improbable that the lands of the subhumid region, large parts of which, on the eastern side of this great longitudinal belt, have already been taken up and are under cultivation with varying success, large parts of which still remain open to settlement, may be found to have a somewhat wider adaption to agricultural purposes than is assigned them by Major Powell. There remains, moreover, to be brought into account the body of lands in the arid region, fairly subject to irrigation, which may be taken up under the desert-land act, and for which a sufficient amount of water is now found in the streams. The aggregate extent of these lands is stated by the Public Land Commission at 30,000,000 acres. There is reason to believe that large portions of this will soon, and all of it eventually, be made productive by systems of reservoirs and irrigating canals.

As the joint effect of all these considerations, I reach the conclusion that it is not unreasonable to suppose that the extent of lands actually occupied for the production of exportable crops may go on increasing to the close of the century. Supposing the amount of arable lands in the possession of individuals disposed to cultivate them to attain, at that date, its maximum, the further question arises: What term may then be allowed us, as a people, for continuing our traditional system of cropping, with something like the degree of immediate profit to the owner of the soil (for, let it be borne in mind, it has never been the greed of occupiers who were not owners which has led to the steady pursuit of this system in the past) which has heretofore attended it?

Any answer that might be given to this question would, of necessity, be very largely conjectural. What with improvements in agricultural methods and appliances, which are certain to be sooner apprehended and more widely used here than anywhere else in the world; what with the rapid extension of our railway lines; what with the intensification of culture, either through the subdivision of existing landed properties or through the multiplication of hired hands upon the larger farms, I see no reason to doubt that throughout the first half of the coming century the production of the chief staples of American agriculture might go on increasing, not only absolutely, but even per capita of population, as it has increased from 1800 to the present time, new lands, now nominally occupied, but not cultivated up to a half, a quarter, or a tithe of their capability, coming in, not only to make good the loss by exhaustion of lands now of full bearing virtue, but to allow the increase of our population up to the gigantic total of a hundred or a hundred and twenty-five millions without impairing our ability to export as largely and as variously of agricultural produce as today.

But there is even a better prospect for our agriculture than this. The powerful reasons, economical and political, which have in the past justified the cultivation of the soil, in some degree at the expense of future generations, have mainly ceased to exist, and will soon disappear altogether. The country, in its arable parts, is settled, and the line of population now rests near the base of the great sterile mountains which occupy so large a portion of the continent. The accumulation of capital out of the profits of American agriculture under the system of cropping that has been described have been so great at the North and West as even to keep ahead of the occasions for their remunerative investment, as is shown by a falling rate of interest; and there is no longer any reason to be found in the scarcity of capital for postponing the systematic cultivation of the soil. Lastly, the political reasons which made the early settlement of the country so urgently desirable are no longer of force.

With adequate labor power and capital, and with all national exigencies satisfied, the time has come when economical and political considerations alike demand that the soil bequeathed to this generation, or opened up by its own exertions, shall hereafter be deemed and held as a fund in trust for the American people through all time to come, not to be diminished or impaired for the selfish enjoyment of the immediate possessors.

Down to this time our apparently wasteful culture has, as I have sought to show, been the true economy of the national strength; our apparent abuse of the capital fund of the country has, in fact, effected the highest possible improvement of the public patrimony. Forty-eight noble states, in an indissoluble union, are the ample justification of this policy. Their schoolhouses and churches, their shops and factories, their roads and bridges, their railways and warehouses, are the fruits of the characteristic American agriculture of the past.

But from a time not far distant, if indeed it has not already arrived, a continuance in this policy will be, not the improvement of our patrimony, but the impoverishment of our posterity. There will be all the difference between the past and the future, in this respect, morally, economically, and patriotically considered, which there is between the act of the strong, courageous, hopeful young man who puts a mortgage on his new farm that he may stock it and equip it for a higher productiveness, and the act of the self-indulgent man of middle life who encumbers his estate for the purposes of personal consumption.

57. THE FUTURE USE OF LAND IN THE UNITED STATES[1]

By RAPHAEL ZON

In a new country, with a wealth of land and a scanty population, the use to which the land is first put cannot serve as an indication of its best ultimate use. Gradually, as the population increases and the knowledge of the properties of the different classes of land grows, there is a closer correspondence between the character of the land and the crops to which it is devoted. In such densely populated countries as Belgium and France, practically every acre of land is put to its most appropriate use. Thus in France, for instance, 83 per cent of the poorer sandstone soils is forested, while of the fertile alluvial soils only 5 per cent is under forest. More than half (56 per cent) of the French forests are on non-agricultural, calcareous soils. But in this country there are still thousands of acres naturally adapted to agriculture which are now under forest growth, chiefly hardwoods; and there are many slopes cleared of timber and turned into pastures or fields which in a few years become washed out and had best be kept under forest cover.

[1] Adapted from *Circular No. 159, Forest Service, United States Department of Agriculture*, pp. 4–15.

How rapidly the relative areas of land devoted to the different purposes are changing may be seen from this. Hardly one hundred years ago the United States east of the Mississippi River was an almost unbroken forest, comprising something over 1,000,000 square miles, or about 700,000,000 acres. Now, after about a century of settlement, there are not more than 300,000 square miles of merchantable forest land in the Eastern United States. About 330,000 square miles have been cleared for farm land. The remainder has been culled of its valuable timber and devastated by fire or else turned into useless brush land. With the growth of population and the greater demand for agricultural land the ratio between farm and forest land will change still further. The forests will be more and more crowded into the mountains and upon soils too thin or too poor for agricultural purposes. It may be safely assumed that in fifty or one hundred years the proportion of land devoted to the different purposes will change almost as much as it has during the past century. These changes will occur especially in the eastern part of the United States, because there the forest is not confined, as it is in the West, to high altitudes, where agriculture is generally impracticable. In the West the forests, with a few exceptions, as in the low country around Puget Sound, are in the high mountains, which rise in the midst of semiarid plains, and their original area of 150,000 square miles, half of which lies in the Sierra Nevadas and in the Cascades and half in the Rockies, has changed but very little since settlement. In the West, the increase of agricultural land must be secured chiefly through the irrigation of the semiarid land.

If we take a long look ahead into the future and try to picture to ourselves what will be the ultimate proportion of farm, forest, range, and desert in this country fifty years from now, in the light of the increasing demand for agricultural land and of the approximate knowledge of the climatic conditions and the physical properties of the different lands in this country, we shall get something like the following condition:

Absolute forest land	19 per cent
Intermediate between agricultural and forest land	2
Agricultural land	51
Grazing land	26
Barren land	2

Agricultural land.—The area devoted to agriculture in a half-century, instead of being 21 per cent of the total area, as it is now,

will be nearer 50 per cent. That this is not an overestimate is indicated by the fact that during the last fifty years the improved farm land in this country has advanced in round figures from 113,000,000 acres to 415,000,000 acres, an increase of 302,000,000 acres, or nearly 370 per cent. At such a rate of increase, the agricultural area of this country in 1950 would require an additional area of over 1,000,000,000 acres and would include nearly 80 per cent of the total land area of the United States.

With more intensive methods of cultivation larger yields will undoubtedly be obtained from the same area, yet the area itself under agricultural crops will have to be increased, especially if we are to remain an exporting country. This is well shown in the case of some of the older countries. Thus in Belgium the arable land forms 63 per cent of the total land area, in Denmark 68, in France 48, and in Germany 47. Still, these countries are not exporters of cereals, although their methods of cultivation are highly developed. France is especially interesting as a criterion, because its methods are most intensive and it is the only country that is self-sustaining; it produces 98 per cent of all the cereals which it consumes. There is little doubt that our population in the next fifty years will reach at least 150,000,000, or about 50 persons per square mile. Whether the acreage of improved farm land will increase at a much faster rate than the population, as has been the case in the past, or whether it will grow at the same or even a slower rate than the population, the future alone can tell; but increase it must.

The Bureau of Statistics of the Department of Agriculture estimated in 1900 that upon the basis of our present actual consumption as a people, disregarding entirely our export trade, our country will require by the year 1931 the following additional acreage: for wheat, 13,500,000 acres; for corn, 66,000,000 acres; for oats, 23,700,000 acres; for the minor cereals, 10,000,000 acres; and for hay, 40,500,000 acres; a total of 153,700,000 acres, without providing for the proportionately increased consumption of vegetables, fruits, and other products.

The amount of farm land as compared with other classes of land is not determined, however, solely by economic conditions, but also by natural conditions. Thus in mountainous Switzerland, only 17 per cent of the land is cultivated, and in Sweden and Norway, situated in an unfavorable climate and with a scanty population, the proportion of arable land is 8.7 per cent and 1.3 per cent, respectively. In

the eastern part of our own country, with less rugged topography than the West and more favorable climatic conditions, the extension of farm land will go on at the expense of the land now occupied by the forest, but capable of producing crops, and the forest land proper will be confined to thin soil and the steep slopes of the mountains. In that part of the West which has a very rugged topography and very unfavorable climatic conditions, additional farm land will be won chiefly from the semiarid lands and not from the forests, which have been relegated by nature itself to soils and situations unsuitable for agriculture. There is, of course, here and there in the Pacific Coast mountains, and even in the Rocky Mountains, land which can be used for agricultural crops, but on the whole the western mountains will always remain chiefly a forest region and the relative area of forest land and farm land there will always be determined chiefly by nature.

Grazing land.—Land chiefly valuable for grazing will form about one-fifth of the extent of the United States proper. This land originally lay west of the one hundredth meridian, in the plains and mountain valleys, but with the advance of dry farming its eastern boundary has been shifted farther west to about the one hundred and third meridian. This land receives but a scanty rainfall and can produce neither forest nor field crop, but supports a vegetation of hardy grasses. It was formerly the natural range of millions of buffalo and is now the grazing ground of herds of cattle and sheep. This land will remain largely a natural range, since the area which can be irrigated, and thus reclaimed for agricultural purposes, or which can even be used for dry farming, is comparatively small.

According to government estimates, the available water will be sufficient to irrigate 71,000,000 acres, or 1 acre in $7\frac{1}{2}$ of the entire region. The Reclamation Service, however, does not expect to reclaim more than 5 per cent of all the arid land. This area, together with that used for dry farming, may hardly be sufficient even to counterbalance the reduction of the productive area in the United States through the growth of cities, the building of railroads, and the general development of commerce and non-agricultural industry. With the exception of this 5 per cent and whatever area can be brought under dry farming, the rest of the land will be forever devoted to grazing purposes. While only a small portion of this land can be brought under the plow, the possibilities for increasing its productive-

ness as a range—at least the 300,000,000 acres of public grazing land—are very great.

Desert land.—About 2 per cent of the total land area will forever remain desert. There are but few areas within the United States which, either on account of the intense heat, very low temperatures, alkali, or lack of rainfall, are unfit for the use of man and may be truly considered desert land. Such land is found in the Southwest about the Gulf of California, in Nevada, in Utah, and in Oregon in the form of arid basins. Ice-bound deserts are found in Alaska and on the glacier-covered mountains. This land must, so long as the climatic conditions of the country continue as they are, remain unproductive.

Forest land.—As we have seen, although some land can be won from the plains through reclamation and dry farming, this area will hardly be enough to offset the loss of productive land through the growth of cities, and will at best supply only a small part of the additional area needed for raising farm crops. In the West, except in a few places along the Pacific Coast, the forest area will not be reduced, for the simple reason that the land there is not suitable on the whole for agricultural purposes. If it were reduced, the result would be to reduce the farm land lying below, which is dependent upon irrigation. The additional agricultural land must come, therefore, chiefly from the East through improvement of the present unimproved farm land and swamp land, and at the expense of the forest land proper. The forest land will be confined more and more to land which is clearly unsuitable for agriculture, and will probably shrink to an area of about 360,000,000 acres, or nearly one-fifth of the total land surface.

Intermediate land.—In addition to these areas which are unsuitable for any other purpose but that of raising timber, there will always be belts and patches of land which are neither exclusively forest land nor agricultural land, but may be devoted to either purpose as the local conditions (such as density of population and distance from markets) may make the one or the other more profitable.

The hilly country of the Northeast, where stones and bowlders render cultivation difficult, the hilly land of the Piedmont Plateau and of the Ohio Valley, where the heavy soil makes erosion very great, and the sandy land along the Atlantic Coast and in the lake states are included in this class of land. This land, intermediate in character, is included at present largely with the unimproved farm

land, and will be so more and more in the future. Of the 426,000,000 acres of unimproved farm land, about 150,000,000 to 200,000,000 acres are now estimated as woodlots, although not all farm woodlots are necessarily on intermediate land. The rest is swamps, barrens, and tide lands. With the increase in population and the increasing demand for farm lands for cultivation, the areas of individual woodlots will probably shrink. The number of woodlots, however, will undoubtedly increase as the people more fully realize their value as a protection against erosion, winds, and frost, and the woodlot will play an essential part in intensive methods of farm management. While it is difficult to predict their exact extent, it is safe to assume that there will always be a large area of farm woodlots. These woodlots will in the future, as at present, produce the posts, poles, and fuel needed on the farm and will grow some timber as well.

Thus, in order to provide a population of 150,000,000 people with all the timber needed for construction, ties, poles, pulp, and all the various uses for which wood seems to be the only suitable material, there will be available an area of about 360,000,000 acres, in addition to the area under woodlots, which may be liberally estimated as 100,000,000 acres, or a total of only about 450,000,000 acres of forest land against the present 550,000,000 acres. This forest land, in addition to supplying the timber, must also protect the soil from erosion, regulate the stream flow, and exert its wholesome influence upon the lives of the people.

Will this area be sufficient?

While we have at present no accurate means of determining the extent of forest land necessary for the regulation of stream flow and the protection of the soil against erosion, it may be inferred from a study of the conditions existing in other countries that, in order not to disturb the natural balance, the proportion of forest land to other kinds of land must be not less than from one-fifth to one-third of the total area of the country.

With the exception of those countries which have naturally a humid climate, like Great Britain or the Netherlands, the countries with a forest area of only 20 per cent or less show usually to a marked degree bad climatic conditions, with prolonged droughts, frosts, and alternating floods and low water, as a result of the reduced forest area. Portugal, with a forest area of only $3\frac{1}{2}$ per cent of the total; Spain, with 16 per cent; Greece, with 13 per cent; Turkey, with 20 per cent; and Italy, with 14 per cent, are good examples.

It would be a shortsighted land policy to withhold agricultural land for the growing of timber. The fundamental principle upon which a wise national land policy should rest is that every acre of land should be put to the use under which it will bring the highest returns. Realizing as a nation that the forest lands in this country will have to be reduced in order to make room for agricultural crops, we should perceive that a national policy which will provide for the proper care and protection of the remaining forests is essential to the best development of the country. It is the duty of the government to help the people in adjusting the various lands for the uses to which they are best adapted by classifying them upon the basis of their properties and the climatic conditions. A thorough survey of the lands in the United States with a view of determining the best use to which the various classes could be put would go a long way toward bringing about the most productive use of our greatest resource—the land.

58. ONE AVENUE OF ESCAPE—ATMOSPHERIC NITROGEN[1]

By THOMAS H. NORTON

One of the chief services rendered by chemistry during the nineteenth century was to reveal the dependence of animal and vegetable life upon nitrogen, to define clearly the rôle of this element in nature, and to increase the number of technical products containing nitrogen. At the close of the century the consumption of such compounds had reached an enormous figure and was growing at a steadily increasing rate. At the same time economists saw clearly that the sources were limited, that their value would soon mount, and that at no distant date it would be impossible to supply the world's demand for combined nitrogen. The recognition of these facts has led to the intense study of the best means of increasing the supply of nitrogenous compounds, one of the pressing economic problems of the twentieth century. Its importance is felt most keenly in Germany, where the annual per capita consumption of nitrogen in the form of crude primary compounds has now reached 5.18 pounds.

In the United States the per capita consumption is at present only a little over half that for Germany. It is, however, rapidly growing, and the United States is now sending abroad over $32,000,000 annually for the purchase of nitrogen in its various combinations, and over half

[1] Adapted from *Reports of the Department of Commerce and Labor, Bureau of Manufactures*, Special Agent Series, No. 52.

of this sum is expended for a single item and goes to a single country—Chile. Further, nearly all the nitrogen contained in the lists of more valuable nitrogenous compounds is derived from Chile saltpeter, exported to European countries, chiefly Germany. The fact that the United States, in common with all civilized countries, is so dependent upon this one source, and the additional fact that the deposits of nitrate in Chile are not particularly extensive and are destined at an early date to complete exhaustion, constitute the nitrogen problem.

The efforts that are being made to release the manufacturing and agricultural interests of the world from this dependence assumes an increasing importance each day. The most decided progress is being made by the chemists in Germany, Scandinavia, France, Switzerland, and Austria. Attempts to bring about a direct union between hydrogen and nitrogen were made at an early date—by Renault in 1846. Professor F. Habber, of Carlsruhe, with the aid of G. Van Oordt, published in 1905 and 1906 a series of papers in which the general conditions for a successful solution were clearly defined. Professor Habber's process has come under the control of the Badische Anilin- und Sodafabrik of Ludwigshafen, the leading chemical company in Germany, which is devoting particular attention to the solution of the nitrogen question. It is actively engaged in perfecting this synthetic process so as to have it ready for technical purposes when the "psychological moment" arrives.

Nitrogen is now supplied for industrial purposes by the Linde, Pictet, Claude, and other methods at exceedingly low rates. In France prices range from two to ten centimes per kilo (0.18 to 0.9 cent per pound). In Germany three pfennigs per kilo (0.32 cent per pound) is not an uncommon rate. Herr Linde states that his smaller machines yielding one hundred cubic meters per hour (cubic meter=35.314 cu. ft.) can supply 99.5 per cent nitrogen (0.5 per cent oxygen) for six pfennigs per cubic meter (1.25 kilo), or 0.648 cent per pound. Very large plants can produce the gas somewhat more cheaply. It is probable that the owners of the Habber patents have it in their power to produce ammonia, and hence ammonia compounds, profitably at prices far below those which these substances now command in the world's markets. As ammonium sulphate, the dominant member of the group, is used almost exclusively as a fertilizer, and as ammonia is exclusively a by-product of the distillation and coking of coal, etc., its price is controlled almost entirely at present

by that of Chile saltpeter and the world's demand for combined nitrogen. With any possible introduction on an unlimited scale of a new form or source of combined nitrogen, the production of Chile saltpeter would soon be largely abandoned. The production of ammonia from gas works and coke ovens would, however, continue indefinitely.

A method for the synthetic production of ammonia has recently been patented in France by Brochep and Boiteau. Mention should also be made of the method proposed by H. S. Blackmore for effecting the synthesis of ammonia from its constituent elements. Details are lacking as to the technical value of this American process.

The three principal processes mentioned above are the only ones thus far (January, 1912) in successful operation on a commercial scale. In 1905, Swedish and especially French capital became interested in the undertaking already begun by Norwegian capital. The earlier organization was merged into a new company with a capital of $1,876,000, entitled the Norwegian Hydro-electric Nitrogen Company. The plant was enlarged to twenty times its former capacity and valuable water-power sites in various parts of Norway were acquired. During this period the Badische Anilin- und Sodafabrik had pushed forward its tests with the Schönherr furnace in its experimental plant at Christiansand. The value of the new process became evident. Two other powerful German chemical companies of Berlin joined forces with the "Badische" to develop the Schönherr process.

Under the circumstances, those in control of both processes decided that the best policy was to combine their interests and work in unison. Accordingly, in 1907 they created two new companies. The Norwegian Power Company has a capital of $4,288,000 and aims to acquire and regulate available water powers in the kingdom. The Norwegian Nitrate Works Company has a capital of $4,824,000 and confines its activity to the manufacture of nitrates and allied products. This creation of two distinct companies, one occupied with the development of power, the other with its utilization, is an imitation of the procedure of the capitalists who established electro-chemical industries in Switzerland. The Franco-Norwegian company and the German group each subscribed to one-half of the shares of the two new companies. The former retained its factory at Notodden and continued its operation. The latter did the same with its small plant at Christiansand. All the energies of the newly founded companies were directed at once to the erection of a power works at Rjukan, and to the erection at Saaheim of the vast nitrate works that are to begin

operation in 1912. The confidence of capitalists in the future of the industry seems to be firm, and the Franco-Norwegian company has had no particular difficulty in securing funds in the Paris market. Its capital in January, 1912, reached a total of $7,943,430. At the annual meeting in May, 1911, dividends were declared on ordinary stock and of 8 per cent on the preferred stock. Much more capital will be needed before all of the water power now under the control of the company can be regulated and used in the production of nitrates. At the lowest estimate fifty million dollars will be required.

In 1905 the export of calcium nitrate was 115 tons; in 1907, 1,344 tons; in 1910, 13,531 tons. The export of sodium nitrite rose from 900 tons in 1908 to 3,200 tons in 1910. In the latter year 1,074 tons of sodium nitrate were exported. It is estimated that about 2,000 tons of calcium nitrate are used annually as fertilizer in Norway. Including a certain amount of nitric acid for local consumption, the total production in 1910 was equivalent to about 22,000 tons of calcium nitrate. When the water power at Saaheim is completely utilized for the production of nitrate, the total Norwegian output will reach about 160,000 tons. This is equivalent in nitrogen to 5.7 per cent of the world's production of Chile saltpeter in 1910.

It seems certain that the manufacture of nitric acid and the nitrates from the atmosphere is established upon a firm basis and destined to expand steadily within the limits fixed by the two main controlling factors: first, the cost of the available electrical energy, and second, the market rate for the time being and certainly for a fair share of the present century of Chile saltpeter. In considering to what extent the new processes for utilizing atmospheric nitrogen are susceptible of introduction under American conditions, the following points are to be borne in mind: The synthetic production of nitric acid from the atmosphere is a highly specialized process, dependent for the time being on exceptionally cheap sources of electricity. Many are laboring upon the problem of increasing the output per unit of electric power. Such experiments are most advantageously conducted in connection with the gigantic plants in Scandinavia.

In conclusion, it can be regarded as beyond doubt that the present achievements of applied chemistry in this field render it possible for American industry and American agriculture to face the threatened exhaustion of the nitrate deposits of Chile and the demands attendant upon a rapidly growing population without any feeling of apprehension. The processes already perfected and described in detail show

that there is no early danger of a nitrogen famine. The continued perfection of the processes and the appearance at frequent intervals of novel additional methods, as well as the popularization of the new forms of combined nitrogen, all point to a steady movement forward and to the assurance that combined nitrogen, as an industrial product, will be furnished on an increased scale without advance in cost above existing rates as fast as the demand is evident.

IV

HUMAN EFFORT AS A FACTOR IN AGRICULTURAL PRODUCTION

Introduction

It goes without saying that man himself is the center of our consideration in economics. In agricultural economics it is the farmer who is, in all cases, the ultimate subject of our concern. We have already examined his position as a consumer of wealth; in a later chapter we shall view him as a claimant for income; here we propose to see what part he plays as a factor in the productive process.

Evidently it is a large part: the socialist goes so far as to say that the laborer is the only productive agent. Such is, however, an arrogant account of the process by which man exploits the bounty of nature, and it makes scant acknowledgment to those who, in the past, have abstained from consuming all the products that came to their hand, in order that tools and machines and other forms of capital might be accumulated to equip our efforts. Still, we realize that some measure of human participation and direction is essential before these natural forces and these inert goods can be made to yield a maximum product of the kind most suited to man's needs and at the times and places of that need.

Not quite so clear, perhaps, is the method by which we shall gauge and measure this productive element called labor. Just what are the conditions which cause the human factor to make its largest and most valuable contribution? If each human being meant, always and everywhere, one labor unit, the matter would be simple enough. But, even aside from the obvious fact that nature has given widely various physical endowments to the different members of our human family, labor in the economic sense means mental as well as physical effort, and the intellectual and spiritual qualities of individuals vary even more widely than their stature or their strength. Most significant of all is the fact that human powers are to be valued in terms of their timeliness, their suitability to a given productive situation and equipment, rather than by any absolute standard. One hundred Chinese coolies are not the labor equivalent of one

hundred European peasants, nor are these latter precisely equal in labor power to one hundred American farmers. Similar differences appear if we make comparison between different sections of our country or periods of our history. This is evident if we set the farm workers of Massachusetts, Mississippi, and Montana side by side, or if we compare the homesteader of the past with the average American farmer of the present and the thoroughly trained and organized agriculturists we aspire to see upon our farms in the near future.

American farm labor in our grandfathers' day was fairly uniform in quality. Any stout boy not mentally handicapped might become, if he grew up amid actual farm experiences, a standard farmer. The rural superman was the one who could swing scythe or cradle or flail longer and stronger than his fellows. Then came the widespread use of farm machinery, and the man possessed of mechanical ability became differentiated from the mass of country workers. Within comparatively recent times success in farming has come to be identified with ability to grasp and apply the principles of scientific agriculture—if not always with full understanding, at least with some discernment and a steadying faith in the value of book-learning. Today the farmer finds himself swept into the maelstrom of commercial competition, and he must add salesmanship, cost accounting, and scientific management to his list of qualifications if he is to make his work a success.

In industrial life a similarly growing demand for greater technical efficiency and larger commercial abilities has been met by division of labor and specialization of functions. But the possibility of such a solution in the case of agriculture is decidedly less. The factory machine is made automatic or nearly so and a woman is set to tend it, or a whole battery of machines is put in charge of one mechanic. But though a binder be made to do a complex task automatically, the machine still requires a driver of some skill, more judgment, and not a little bodily strength. Likewise, a factory work-schedule may be laid out for months in advance and adjusted with the nicest degree of precision, but no farmer's day is sacred from the disrupting action of the weather, the unpredictable behavior of live stock, or other untoward event.

This means that farm work has not been extensively specialized downward for "hands" or unskilled help. In this regard agriculture makes a more exacting demand for labor than do industrial callings, and is thus precluded from drawing, to any great extent, upon the

common mobile supply. At the same time, it is more favorably situated for keeping up a steady flow of new workers born and reared within the families of the old. In the past, however, agriculture has been conspicuously unsuccessful in inducing the best of such workers, or at least those of large ideas, to remain in its ranks. For agricultural work has shown also a lack of specialization upward in the direction of large executive opportunity or to any high degree of professional expertness. Our captains of industry, though many of them born on the farm, have found scope for their talents and energies only in the city. Though the stay-at-home brother was, at least sometimes, as able as the brother who went to town, he has remained mute and inglorious.[1]

It may well be asked whether this situation does not mean a loss in total labor power in the country. The demand is held rather rigidly at certain set specifications for all workers, with agriculture as a single trade to be carried on by apprentice, journeyman, and master-farmer. But God casts men in many molds, from those of extraordinary constructive and executive ability through countless gradations down to those who attain merely to a sort of vicarious efficacy by faithfully following a routine laid out for them. Can agriculture devise ways of fitting appropriate tasks to each of these human powers, utilizing the greatest but not neglecting the least? Until we do, the most valuable of all our productive resources runs to waste. To no small degree this becomes the problem of proper organization of agricultural production, and as such will be returned to in chapter vi.

A. Population and the Labor Supply

59. THE SUPPLY OF FARM LABOR[2]

By GEORGE K. HOLMES

Industrialism and city expansion have advanced in this country faster than agriculture. The lure of the city and the city's illusion of higher wages are robbing the farm of its laborer and of the farmers' children who would otherwise be the potential farm owners of the future.

[1] To complete the allusion: Is he also to be congratulated on being "guiltless of his country's blood"—a satisfaction foregone by some of those city-migrating Cromwells who have captained our industrial revolution?

[2] Adapted from "Supply and Wages of Farm Labor," *Yearbook of the Department of Agriculture*, 1910, pp. 189–200.

The more or less imperfect census record is the only information possessed in regard to the number of persons engaged gainfully in agriculture in this country. It is very considerably an imperfect record previous to the census of 1900, for the reason, principally, that enumerators often reported agricultural laborers as laborers without any designation of kind of work done by them, and for this reason the agricultural element in the population is represented as being less than the fact. It may be that in some small degree this observation applies to the census of 1900.

In 1820 the number of persons of both sexes reported as being engaged in agriculture was 2,068,958, including slaves, and with the same inclusions the number for 1840 was 3,719,951; by 1880 the number had increased to 7,663,043; by 1890 to 8,466,363; and by 1900 to 10,249,651 (census report on occupations).[1] In the later censuses the persons are described as having been employed gainfully, a distinction not made in the earlier ones. The statements are for the contiguous states and territories of the Union.

The agricultural element was 83.1 per cent of persons having occupations in 1820; 77.5 per cent in 1840; for gainful occupations, 44.1 per cent in 1880; 37.2 per cent in 1890; 35.3 per cent in 1900. For 1910 the inference is that one-third or less of the persons having gainful occupations are embraced in the agricultural class.[1]

Agricultural laborers constitute one of the primary classes of occupations, and their number, as before stated, has been reported by all censuses as below the fact because the enumerators have reported many of them as general laborers. Another element of error has been the reporting of negro "croppers" in the South in the census of 1870 and subsequent ones as farmers, whereas they would have been more properly designated as farm laborers, since they worked for wages, although the wages were contingent. Taking the record as it stands, the number of agricultural laborers in 1880 was 3,323,876; in 1890 it was 3,004,061; in 1900, 4,410,877. The erroneous character of the census enumeration with regard to agricultural laborers appears when it is observed that they were represented as being 43.4 per cent of all persons engaged gainfully in agriculture in 1880; only 35.5 per cent in 1890; and 43 per cent in 1900.

[1] The number for 1910 was 12,567,925 and the percentage 32.9 according to Table 9 (p. 41) of the "Occupational Statistics" (Vol. IV) of the Thirteenth Census, but this table shows figures slightly higher than those given above for previous years.—EDITOR.

Analysis of the occupation figures of the census of 1900 discovers that 12.3 per cent of all persons having gainful occupations in the North Atlantic division of the states were engaged in agriculture; 26.1 per cent in the Western division; 36.3 per cent in the North Central division; 49.9 per cent in the South Atlantic division; and 62.8 per cent in the South Central division, the average for the United States being 35.3 per cent. Agriculture as an occupation is of least account, relatively, in New England, New York, New Jersey, and Pennsylvania, the group of states constituting the North Atlantic division, and is of greatest account in the lower section of the Mississippi Valley, constituting the South Central division.

The agricultural element in the population, as indicated by the occupation statistics of the census, is relatively a diminishing one, and it is generally believed that the agricultural laborers, or those who work for hire, are a diminishing relative element in the agricultural population, although this does not appear in the imperfect census record.

Immigration contributed much to the agricultural population until the supply of cheap and otherwise desirable public land was nearly exhausted. At the present time, when land that immigrants can readily utilize for agriculture is high priced, they are not contributing appreciably to the agricultural population. During the year ending June 30, 1908, the immigrant aliens admitted to this country numbered 782,870, of whom, or their equivalent, 50 per cent returned to their native countries on account of the industrial depression they found here; the number arriving in the fiscal year 1909 was 751,786, of whom 30 per cent returned; and in 1910 the arrivals were 1,041,570, of whom 17 per cent did not remain.

By means of census publications, the white foreign-born agricultural laborers, as an element of the total white agricultural laborers, may be determined. In 1890 the white foreign-born element was 13.1 per cent of all white agricultural laborers, and the percentage declined to 8.5 in 1900. In the latter year only 258,479 agricultural laborers were foreign-born whites in a total of 3,038,884 white agricultural laborers. The white foreign-born as an element of the total white agricultural laborers was 0.6 per cent in the South Atlantic States in 1900; 2.6 per cent in the South Central; 11.8 per cent in the North Central; 15.6 per cent in the North Atlantic; 20.9 per cent in the Western.

If the number of agricultural laborers of foreign parentage were taken for 1900—and this number includes many laborers who were American born—it appears that they are 17.4 per cent of all agricultural laborers; but the percentages vary widely among the geographical divisions—in the South Atlantic division, 0.8 per cent; South Central, 3.6 per cent; North Atlantic, 30.4 per cent; North Central 40.7 per cent; and Western, 48 per cent.

Women, as contributing to agricultural labor, are taking a smaller and smaller part, both relatively and absolutely. The census record gives 534,900 women as performing agricultural labor for hire in 1880; 447,104 in 1890; and 663,209 in 1900. The apparent tendency expressed by these numbers is unbelievable and is directly contrary to a nation-wide acquaintance with the conditions of agricultural labor in this country. The deficiencies of the earlier census cannot be estimated, and it may be assumed that the number of female laborers reported in 1900 is near the fact.

The female element of agricultural laborers for hire in 1900 in the total number engaged in agriculture was largest in the South Atlantic States, for which the percentage is 79.9; for the South Central States, 76.5 per cent; North Central, 13.5; Western, 12.8; North Atlantic, 11; the United States, 67.9.

In 1900 women were 10.9 per cent of all persons gainfully engaged in agriculture. As an element of negro agricultural laborers for hire, the female laborers are represented by 37.9 per cent in the United States for 1900; 40.6 per cent for the South Central States; 36.4 per cent for the South Atlantic; 1.3 per cent for the North Central; 1.2 per cent for the Western; and 0.6 per cent for the North Atlantic.

Dependence must be placed upon the general knowledge of conditions with regard to female labor on the farm. The outdoor work of white women on farms of medium or better sorts has greatly declined from early days, and the decline has been rapid during the last generation. Of course negro women do much labor in the cotton field, but this diminishes year by year.

It is not advisable to base any fine distinctions upon the censuses of 1890 and 1900 with regard to negroes employed in agriculture. But the comparison may indicate numerically the drift of negroes in their relation to agriculture. In 1900 the negroes who were gainfully engaged in agriculture numbered 1,704,904, and in 1910 they numbered 2,108,980, an increase of one-half of 1 per cent in their ratio to

the entire number of persons gainfully employed in agriculture. The negro agricultural laborers of 1890 numbered 1,006,728, and in 1900 they numbered 1,344,116, or a decline from 64.9 to 63.7 per cent in their ratio to negroes of all agricultural occupations.

Negro farm labor in the South presents special problems which southern farmers fully understand. The census of 1900 disclosed the fact that negro labor was leaving the farm and migrating to town and city, to the railroad, to the logging and lumbering camp. The negro is still a necessity to southern agriculture, but he is gradually yielding his place to white labor. One of the old arguments in favor of slavery was that a white man could not work in a field under the southern sun, and it is still a common belief in the North that southern farm labor is performed almost exclusively by negroes. This, however, is not the fact. More than half the cotton crop is raised by white labor; in Texas three-fourths or more. In the sugar and rice fields white labor is common and in some places all but exclusive. Negroes are often disposed to migrate in pursuit of chimeras, so that they are easily induced to go to other parts of the country when employment is promised to them, and agents to promote their migration are found where states have not taxed them out of occupation or made it a criminal offense.

If negroes and whites be combined, the negroes will be found to represent 13.7 per cent of all persons in all gainful occupations in 1900, 20.6 per cent of all persons engaged gainfully in agricultural occupations, and 30.5 per cent of all agricultural laborers. The percentages are almost exactly the same for 1890, except that the negro agricultural laborers were 36.8 per cent of the white and negro total, so that there was apparent decline in the negro element of agricultural laborers from 1890 to 1900.

The movement from the city to farm for the purpose of permanent farm life and labor, either for hire or under ownership, has hardly become general enough in this country to present recognizable proportions. There is a little of this movement here and a little there, but nearly all cases are sporadic.

But there is one sort of labor that goes from city to farm which has become large enough to be perceptible, and that is seasonal labor for employment, not in general farming operations, but for special purposes. The migration of men from cities to follow the wheat harvest from Oklahoma to North Dakota is the best-known feature of this sort of farm labor. It is not so generally known that women and

children and some men, too, go from the city to the farm at certain seasons to harvest cucumbers to be sold to the pickle factory; to pick, grade, pack, and dry fruits; to harvest hops and berries, and dig potatoes; and so on with other crops that need a rush of labor at time of harvest. Some labor of this sort is applied also to the cultivation of crops, as in pulling weeds from beets and onions, but this labor does not seem to be used much for cultivating crops and not at all for planting.

There are no indications that the town and city populations will supply any considerable part of the agricultural labor of the future. At any rate, the farmer would not need to get his labor from the cities if he could hold the country population to the soil, and the recognition of the importance of retaining the children on the farm and of keeping country labor from migrating to the cities is governing most of the work by nation and states in behalf of agriculture.

The old practice was to trust to the printed page for the instruction of the farmer, but in the course of time it was found that this was poorly productive of results. Then followed the farmers' institute movement, which consisted of lectures; sometimes later with practical demonstrations.

In the meantime the United States Department of Agriculture and the experiment stations got into more practical lines of work by means of special advice in particular cases, formerly by mail and now also by personal visits; so that it has been discovered that the most successful promotion of agricultural knowledge and practice is caused by practical demonstrations under the observation of the farmers to be instructed.

The largest exponent of this latter plan of instruction is the farmers' co-operative demonstration work, maintained in the South by the Department of Agriculture with outside financial assistance and with the effective help of farmers and planters, without whose aid it would be a failure.

Along with the foregoing is the very recent movement to instruct country children in agriculture at the beginning of their school life and to continue this instruction in the high school and the college. In this way the foundation will be laid for successful farming, and such farming implies the retention of children upon the farm.

Still further and to the same end, many agencies are at work upon the country people to improve their dwellings, their modes of living, their home life, and their social life, which are already beginning to

count against the unpleasantness of country life and in favor of making such life attractive. Influences of this sort, joined to the agricultural education of the young and to the practical teaching of the farmer how to do by doing, at the time when farming is prosperous and profitable, may be depended upon to save to our agriculture all the labor it will need for the maintenance of our national self-sufficiency.

60. NATURAL INCREASE OF THE RURAL POPULATION

a) IN EARLY TIMES[1]

By T. R. MALTHUS

In the northern states of America, where the means of subsistence have been more ample, the manners of the people more pure, and the checks to early marriages fewer than in any of the modern states of Europe, the population was found to double itself, for some successive periods, every twenty-five years. In the back settlements, where the sole employment is agriculture, and vicious customs and unwholesome occupations are little known, the population was found to double itself in fifteen years.

b) AT THE PRESENT TIME[2]

By EDWARD VAN DYKE ROBINSON

The country population of Minnesota increased very rapidly up to 1880, and at a less rapid rate up to 1900, since which date it has been practically stationary. This result might come about through a higher death-rate, a lower birth-rate, or the migration to the cities either of individuals or of large families. The death-rate certainly has not risen, though reliable statistics are not available as to its actual course for the country population. The birth-rate, on the other hand, has declined, at least in some of the older rural districts, from 41.5 per thousand in 1860 to 14.7 for a recent five-year period. This decline of nearly two-thirds in the birth-rate would alone suffice, if general, to explain the decrease of country population. That it is at least widespread is shown by the fact that in one school district after another where formerly there were 25 to 35 children, there are now only 5 to 10. Families now number 3 or 4 in place of 8 to 10. On the

[1] Adapted from *An Essay on the Principle of Population*, 2d ed., p. 4.

[2] Adapted from *Early Economic Conditions and the Development of Agriculture in Minnesota*, University of Minnesota Studies in the Social Sciences, No. 3, pp. 215–16. (Copyright by the University of Minnesota.)

other hand, in communities where people of a single nationality and tongue are compactly settled, especially in the newer parts of the state, families of 8 to 10 children are still common. These facts suggest that the decrease of the birth-rate is due in the main to the spread of education and a higher standard of living, which everywhere tend to check child-bearing. Moreover, before the days of farm machinery children were more useful and could begin to pay their way at an earlier age. This is true on the whole in spite of an occasional task which a child can perform with machinery. It follows that just as laws raising the age of employment have been followed by a decline of the birth-rate among factory populations, so the introduction of machinery has tended to discourage large families on the farm, by postponing the period when the children could become economically useful.

61. THE RURAL EXODUS[1]

By ROY HINMAN HOLMES

The farmer class, which we have grown accustomed to consider the permanent foundation of our society, is showing decided signs of impermanence. The farmer is moving to town. It is not simply a farmer here and a farmer there, each because of reasons of his own who are leaving the land and entering other occupations. The movement, instead, is general in extent. In a comparatively short time the typical farmer of today, who tills the land that he owns, with the help of his growing sons, will be but a national memory.

Often it is charged that the rural schools of today are "educating away from the farm," and it is urged that their influence should be thrown against the cityward drift of the young. But a thought will convince anyone that the schools are no more influential in causing the sons of the farmer to leave the farm than they are in drawing the sons of the merchant away from the store, or in determining the lawyer's sons to turn from the occupation of their father. It is, perhaps, one of the chief functions of the school to broaden the vision of the student—to give him a world-view. The young man should be made to feel that the path his father chose, or was forced into by circumstances, is but one of many, and the school should aid the youth to determine what path he, individually, is best fitted to follow. It should no more be taken for granted that the son of the farmer should be a farmer than that the son of the physician

[1] Adapted from "The Passing of the Farmer," *Atlantic Monthly*, CX, 517–23.

should be a physician. The learned professions are being constantly recruited from without. The son of the physician may go into business or become a civil engineer; there is no dearth of doctors, for other men's sons are studying medicine.

On the other hand, the entrance of farmer boys into occupations other than that of farming is a very serious matter, indeed, for the reason that there is no corresponding movement of young men from the cities to the farms. Though the sons of farmers are among the most successful men in every walk of city life, it is comparatively rare to find a man not country-born who is a successful farmer. The city gates swing easily to admit the country boy; the city-trained lad finds it exceedingly difficult to swing them the other way.

Though from the beginning of the rapid development of the cities there has been a constant movement of country people to them, the migration has been considerably accelerated since the improvement of rural schools, and the placing of high-school advantages within the reach of rural pupils, as has been done in many localities. The virtual extension of city school systems into the country districts, together with other modern phenomena, among which may be mentioned the rural mail system, the rural telephone, the improvement of highways, and the building of interurban lines, is in a large measure breaking down the barriers which formerly existed between the country and the city. The two civilizations, rural and urban, which had until recent years existed to a large degree independently of each other, are rapidly being blended into one. This new civilization thus formed is city-centered, and a strong pull toward the center is setting in.

It is not alone the young people who are today drifting away from the farms to town. There is also a continued movement of older men with their families to the cities. Many farmers of middle age are entering other occupations, depending for a portion of their income upon the proceeds from the farms they have left. Many small towns are made up to quite an extent of a population of "retired farmers," many of whom are still in the prime of life. Instead of having remained at their task until their days of activity should have normally ended, they chose to get away from it while they were still young enough "to get some enjoyment out of life." Like those early miners of gold who chanced to be successful, they, having gathered in their piles, next enter upon the stage of spending. The typical "retired farmer," however, differs very radically from the old-time

miner, in that, as his wealth was not the result of a sudden smile of fortune, he does not spend it in sudden moods of reckless generosity.

The drift cityward is receiving a decided impetus in those country regions best provided with "city conveniences." Communities that had long existed as almost independent social entities, each having a center "at the Corners" where were located the church, the schoolhouse, the store, and the post-office, have had their unity destroyed in these modern days. Formerly, frequent social gatherings were held, when the whole neighborhood would "turn out"—the women and children gathering in the afternoons, and the men, both old and young, joining them in the evenings. The sons of farmers married the daughters of farmers, and new farm homes were established, thus perpetuating the community.

With the coming of improved methods of communication, new groups were soon formed, not on the basis of neighboring farms, but rather on the basis of a freer intellectual choice. Mere physical proximity has less than formerly to do with social grouping. The most intimate acquaintances of the farmer and his family often live in the village or the city several miles away. The sons and daughters of the farmer marry, and are married to, the daughters and sons of the city-dweller. Such marriages result, in the great majority of cases, in new homes established, not on the farms, but in the towns. This is but another way of saying that, with the coming of modern means of communication, so that the actual conditions of life both in the country and in the city are better understood by all than ever before, the attracting power of the city for the country-born is much stronger than that of the country for the city-born.

62. THE BACK-TO-THE-LAND MOVEMENT[1]

"Back to the land" is an attractive slogan, and the clever phrase-maker who amended it to read "forward to the land" made it all the more appealing. Little wonder that the Man in Greasy Overalls or the modern Bob Cratchett who slaves under a green-shaded electric bulb should yield to its seductions.

It had seemed of late that we heard less of this exhortation. But the war in Europe puts all the old problems in new postures, and several recent utterances give promise that we are to hear again the preaching of a landward crusade. Far be it from me to predict how

[1] Adapted from "The War and the Back-to-the-Land Movement," E. G. Nourse, *North American Review*, CCIII, No. 2 (February, 1916), 246–48.

rapid or how great a mobilization will take place when such a call to the colors shall be made. But one thing is evident: the sons of the city are not mere reservists of the army of the land. They may debate the summons, and are free to stay in their present callings unless persuaded that to enlist and serve would be to their advantage.

A glance back over the period of the earlier agitation reveals the fact that, outside of violent personal enthusiasms (and everybody knows at least one farm "fan"), the summons was pretty generally refused. In spite of the high and rising cost of living, and in the face of a mighty exhortation to forsake the city and make their fortunes on the farm, men persistently stayed in town. Those who engaged in painting the lily may have derived profit or satisfaction from the task, but the census enumerators have not been able to discover tangible results of their endeavor.

To get at the facts of the matter we must go beneath its superficial manifestations. Of all the host who felt or feel the gnawings of land hunger, four classes are to be distinguished: those who yearn but do not go, those who move to the suburbs, those who go and return, and those who go and stay. The first class—the fireside farmers—do not swell the output of farm products. They increase the gate receipts at the land-show, the poultry-show, the dairy-show, and the stock-show, and levy toll upon the seed houses, poultrymen, and implement manufacturers, to whom they write for catalogues and information.

The second class limit their operations to a kitchen garden and a chicken coop. Their hand-raised radishes do not demoralize the truck-growing industry, nor do the disappointing performances of their costly Orpington pullets seriously upset the egg market. The cost of the suburbanite's living may be a little lessened, but it entails extra work. For those who are willing to make the effort, there are more fresh vegetables, eggs, and spring chickens on the bill-of-fare and more fresh air and exercise for the family.

Even from the other two classes of rural emigrants the net additions to our agricultural population are much less than at first might appear. They create the illusion of progress by moving in a circle. The first group go to the country full of large hopes, only to find that profits do not come as easily with a hoe as with a pencil. Perchance the tyro farmer loses money alarmingly on his first experiments, or even if he makes some actual profit, it comes so much harder than the accustomed salary or pay-check that the game seems no longer to be worth the candle. Either nerve or resources may fail; there are even

cases on record where the issue was settled by a strike of the women or the children. The sweet and simple joys of the country sour into mere loneliness and an unimagined barrenness of days and nights—particularly nights. Many are the converts of the early exhortation who have already completed that enlightening but impoverishing round trip from the shop or office to the farm and back again.

But not even all those who persist in their intention of becoming farmers, and who actually remain in the business, constitute a real addition to our farm population. Though a thousand city men become farmers, there is no gain to the country nor loss to the city if they merely replace a thousand farmers who sell or rent their farms and move to town—filling the jobs abandoned by the rural emigrants and living in the houses they vacated. Some expansion into new regions has been going on, of course, as growth of transportation or development of irrigation systems, drainage projects, and dry-farming methods have made other areas productive. Sometimes a larger farm has been broken up into smaller tracts, so that two or several men farm where one man farmed before. Absolute growth in both area and numbers has gone steadily on, but it is in the figures showing relative growth that the really significant facts are revealed. The Thirteenth Census shows an increase of farm land of not quite 5 per cent, and improved land in farms of less than $15\frac{1}{2}$ per cent, while population increased 21 per cent. Cities grew three times as fast as rural districts. The percentage of our population to be found outside incorporated places of twenty-five hundred people or more, fell from 58.4 per cent in 1900 to 53.7 per cent in 1910.

B. Some Special Classes of Labor

63. IMMIGRATION AS A SOURCE OF FARM LABORERS[1]

By JOHN LEE COULTER

Agriculture has so long been looked upon as the dumping-ground of all surplus labor in case of city industries, of all poverty-stricken persons in case of famines, and all revolutionary individuals in case of disruption of European countries, that it is hard to realize that we have reached the state where farming in practically all of its branches requires a very high order of intelligence and the capacity to grasp and use a great variety of scientific facts. We may, therefore, say

[1] Adapted from *The Annals*, XXXIII (March, 1909), 373–79. See also selection 262 for a discussion of attempts to distribute immigrants.

that, although it is true that we need farm labor very much, as a relief for current immigration agricultural distribution is not promising.

There are two great classes of immigrants that can find room in various branches of the agricultural industry. The first class is composed of those from overcrowded agricultural communities in their home countries. On account of the high state of development of their industry they can teach us much which we have failed to take advantage of and which would result in the uplift of many of the subindustries in agriculture in this country. These should be urged to bring with them their home industries and introduce new phases of agriculture into this country. The United States has been spending millions of dollars in introducing new plants, animals, and methods of farming from other countries. At the same time little groups of foreigners, such as the Swiss of Wisconsin or later the Italians in some southern districts, formerly thought of as the least desirable immigrants, have settled in our midst and put into practice their home training, which has resulted in the establishing of great industries, such as the Swiss cheese industry. The class of immigrants most desired is, therefore, those who will add most to the industry they enter. But it is not necessary that the immigrants should introduce some new subindustry or be in advance of us in their methods in order to make them eligible to enter the agricultural industries. We may say as a general proposition that farmers from nearly any agricultural community in Europe would be acceptable in some of the agricultural industries of this country.

But it is not enough to encourage one class of immigrants and discourage or prohibit others. The immigrants must not only come from rural districts in their mother-country; if they are to succeed, they must be properly located here. Probably the most important single condition is that immigrants should be directed toward and urged to locate where their physical environment will correspond as nearly as may be to that of their mother-country. By that I mean that not only should the climate be nearly the same but the precipitation, the soils, and the topography should approach that of their former home if possible. Failure to satisfy these preliminary requirements has resulted in almost complete failure or a long period of suffering, while attention to these factors has produced unpredicted successes.

The next consideration of singular importance is that the social environment should be acceptable. If the agricultural operations

are not close to a city where others of the same nationality are employed in other industries it is desirable—almost necessary—that a considerable number be allowed, even induced, if need be, to settle in a community. At first they will live as in a world apart, but they give off ideas and take on others and at the end of a generation or two a few intermarriages will have broken down the hard-and-fast wall between settlements. Common markets, interchange of labor supply, contests between settlements, political and other conflicts, and back of it all the common-school system, soon result in an amalgamated, assimilated race.

The next consideration which should be held in mind in determining upon the distribution of immigrants among the different branches of agricultural industry is the economic status of the people to be distributed and their plans or ambitions for the future. Thus, some are independent laborers, others ready to become tenants, and still others to be landowners. Some plan to be employees as long as they stay; some of these would plan to save a snug fortune in a few years and return to the mother-country; others to earn and use the returns from year to year. Some plan to step up to the position of tenant and employer, others are ready to enter that state at once. Some are ready to become landowners and independent farmers by purchase of land in settled districts, others with less capital would go to the frontier with poorer markets and grow up with the country, enduring hardships but accumulating wealth. There is room for all of these classes of people in nearly all parts of the country.

The extended successes accompanied by individual failures of the English-speaking peoples who early entered the agricultural industry of this country need not be expanded upon here. Neither will any detailed treatment of the extensive settlement by Germans in the North Central States during the last half-century be made. We may place the general influx of Scandinavians into Minnesota and the Dakotas in the same class and pass by all of these—which means the great bulk of immigrants of agricultural peoples—with the statement that they represent success and with the assumption that students of economics know of these classes and know of their successes. It is because we are too apt to stop at this point and say that other nationalities have little or nothing to offer that this paper is presented. The writer would emphasize the fact that we have room for farmers from many lands, assuming that we act intelligently in our choice and properly distribute those who come.

The large Swiss settlement in Green County, Wisconsin, illustrates success in the introduction of a new subindustry of great importance. Having struggled for years trying to farm in the American way, these immigrants finally turned to the great industry of their home country. They had settled in a physical environment which was very much like what they had left abroad. Now several hundred cheese factories are prospering and millions of pounds of cheese are annually placed on our markets. Most of this is the famous Swiss cheese, and nearly all of those engaged in making this cheese and in buying and selling it are Swiss or of Swiss origin. The writer feels that this colony is a great success, is the kind of thing this country wants, is the basis of prosperity in our agriculture, and must not be condemned because of the fact that broad Swiss is sometimes spoken or because the thousands of members of the district are not assimilated during the first generation. The writer has found individuals and small groups of settlers from this colony and from "the old country" moving far up into the Northwest carrying with them the information and ambition to start other colonies as prosperous as the old one. The acquisition of such an industry is as valuable to this country as the introduction of a new plan that may have required the expenditure of a hundred thousand dollars.

Turning from the prosperous Swiss district, we may direct our attention to a Bohemian center in northwestern Minnesota. The Swiss had sent explorers ahead to find a desirable location before coming to this country and settling down. The Bohemians were in no greater financial straits in their home country than the Swiss had been, but they were brought in and located by great transportation companies. The soil where the Bohemians were "dumped" is very good; but the country needs an expensive drainage system. The poor immigrants are not in a position to establish it. The result is that for some fifteen years we have had before our eyes a Bohemian colony numbering hundreds of people unable to establish a prosperous community because of unfavorable natural conditions. These people will succeed in time, despite obstacles, but some common-sense assistance would hasten the day of their prosperity.

In other parts of the United States large settlements of Bohemians of no higher standard are prosperous and happy. As an illustration of the status that should obtain the writer would refer to some of the very prosperous communities of Poles and Icelanders in North Dakota and elsewhere. No class of citizens, whether immigrants or descended

from immigrants half a dozen steps removed, could ask for greater material progress, better buildings—homes, churches, schools, and town buildings—than the Polish settlements around Warsaw, Poland, Minto, and Ardock in Walsh County, North Dakota. The writer's knowledge of this and other communities of like character leads him to say that to encourage such settlements is to foster prosperity and frugality as well as to place the stamp of approval upon a home-loving, land-loving class of farmers. If we pass on to settlements of Russians we may say nearly the same as above.

Nor need we stop with the Swiss, Bohemians, Polanders, Icelanders, and Russians. If we turn our attention to the Italians coming into the South we find them filling the various places demanding attention. There is a large demand for white labor, and the mass of Italians who do not intend to make this their life-home more and more fill a long-felt need. With the great numbers of Mexicans coming across the line for part of a season this demand may gradually be better and better satisfied. There is also a large demand for tenants, and this cry is being answered by Italians. These newcomers are not only fitting into the cotton-growing industry in competition with the colored people, but are proving their efficiency in vegetable and fruit farming. Of late years such settlements as that of Italians at Tontitown, Arkansas, in the Ozark Mountains, show also that Italians can bring their home industry with them and succeed here. They not only settle down as dignified farmers, but actually teach our farmers many things. Vegetables, apples, plums, grapes, and other fruits are successfully grown. If the colony located at Sunnyside, Arkansas, at an earlier date was a failure at first, it is no sign that Italians cannot succeed in agriculture. Immigrants, largely from other industries, placed in competition with negroes in production of a crop that they knew absolutely nothing about, under foremen accustomed to drive slaves, in a swamp country—hot and sickly to newcomers—attacked by malarial fever and losing a large number of the first settlers, it is not to be wondered at that failure was threatened. But success has come even in that case, where failure at first stared all in the face.

With colonies like the Brandsville Swiss settlement in Missouri, with the Italians and Russians coming even into old New England, with Mexicans pushing up into the Southwest, and with other nationalities gradually finding their own, we may indeed turn our attention toward the agricultural industry as a much-neglected field. The cry of "back to the land" will not go unheeded by immigrants who have

come from farms in their mother-country if any reasonable amount of effort is put forth to "assist them to find themselves."

Reference might also be made to the Jewish farm problems of the Middle Atlantic States, problems which have importance as far west as Wisconsin; and to the Japanese and Chinese agricultural labor problems of the far West and Southwest. There are possibilities here which few people have yet appreciated. The question of demand for seasonal agricultural labor and the possibilities of continual labor by passing from one industry to another in neighboring districts or following the same industry from one part of the country to another are left untouched.

64. ITALIANS IN AGRICULTURE[1]

By ALEXANDER E. CANCE

Though the immigrants from Italy, since 1900, constitute a relatively large and increasing percentage of all immigrants to the United States, and although it is estimated that more than 60 per cent of them came from rural districts in Italy, comparatively few have become farmers in the United States. According to the Twelfth Census, a total of 293,424 male Italians over ten years of age of the first and second generations were engaged in gainful occupations. Of this number, only 18,227, or 6.2 per cent, were engaged in agricultural pursuits.

The accompanying table gives the number and location of the principal Italian rural settlements in the United States east of the Mississippi River and in Missouri, Arkansas, Louisiana, and Texas. Besides these there are a few small groups of market gardeners near large cities in the East and others in the outskirts of western cities.

The largest and oldest colonies in the East are those in southeastern New Jersey, on the Pine Barrens. Both North and South Italians are represented at Vineland, and Hammondton is one of the largest and most promising South Italian farm colonies east of the Rocky Mountains. In New England, South Italians engaged in market gardening and truck farming near Providence, Rhode Island, at least as early as 1844. Market gardening has increased in importance, and this settlement has been augmented slowly by accretions from the industrial population in the vicinity. North Italian farmers have established a settlement near South Glastonbury, Connecticut, not far from Hartford. The leading occupation there is

[1] Adapted from *Reports of the Immigration Commission*, Vol. I, 559–70.

fruit raising—peaches and apples. This is a good type of foreign colony, established on comparatively sterile, forest-covered New England soil. The principal farm settlements of Italians in New

State	City or Town	Approximate Number of Persons
Rhode Island	Olneyville	225
Connecticut	South Glastonbury	375
New York	Canastota	500
	Lyons and Clyde	1,000
	Albion	350
	Port Byron	300
	Geneva	1,500
	Oneida	475*
New Jersey	Hammondton and vicinity	2,000
	Vineland and vicinity	5,000
Alabama	Daphne	180
	Lambert	60
Arkansas	Gracie	100
	Sunnyside	576
	Tontitown	400
Louisiana	Independence	1,200
	Kenner	700
	Millikens Bend	28
	Shreveport	32
Mississippi	Delta Region	508
	Gulfport	10
	Long Beach	30
	Bay St. Louis	50
Missouri	Knobview	220
	Marshfield	30
North Carolina	St. Helena	180
	Valdese	300
Tennessee	Memphis	260
	Paradise Ridge	60
Texas	Arcadia	30
	Alta Loma	125
	Beaumont	125
	Bryan	1,700
	Dickenson	750
	Hitchcock	100
	Lamarque	15
	League City	25
	Little York	350
	Montague	250
	San Antonio	130
	Victoria	75
Wisconsin	Genoa	245
	Cumberland	1,000

*Farm laborers brought in for the season.

York are in the western part of the state, along the Erie Canal, in a region of heavy muck soil, hard to clear but well adapted to vegetable growing.

In Wisconsin, two rural settlements were investigated, aggregating somewhat less than 250 families. One of these is an old colony of North Italians at Genoa, near the Mississippi River, just south of La Crosse. It represents the type of colony that has practically ceased to grow by additions from without and whose members are as fully Americanized as their German and Scandinavian neighbors. The South Italian colony at Cumberland, Wisconsin, is a different type. It is of recent origin, established on uncleared land, with great pine and hard-wood stumps. The members are chiefly railroad laborers, with whom agriculture is an incidental occupation until the land is paid for. Paying for land with supplementary earnings from industrial labor is not new, but there are few more pronounced types of this on a community scale than that presented by the Cumberland colony.

Reference has already been made to the fact that less than 7 per cent of Italian immigrants engage in agriculture, although it may be considered a safe generalization that more than one-half, perhaps two-thirds, of the Sicilians and other South Italians and one-fourth of the immigrants from Northern Italy were farmers or farm laborers abroad. It is also significant that the proportion of North Italian immigrants who have engaged in agriculture is much greater than the proportion of South Italians, although a much larger proportion of South Italians were farmers or farm laborers abroad.

Substantially all Italian immigrants are poor and come to the United States to better their economic condition. The newcomer, therefore, must at once engage in some occupation that will give him immediate returns. He has no money to travel, and no capital; of necessity, he becomes a wage-earner. It is possible that many Italians, after gaining their economic independence and accumulating a little money, would become farmers if they knew where to buy small parcels of cheap land. The deterrent influences are the isolation of farm life, ignorance of the location of suitable farm lands for sale, lack of experience in American farm methods, and the somewhat tardy and uncertain returns from independent agriculture.

Unless settled in communities, the Italians have not proved successful pioneer farmers; nor are the most of them engaged in extensive agriculture, where many acres and considerable equipment are necessary. In almost every instance they seem to succeed best when they live close together, cultivate small farms, and raise crops that require hand labor rather than expensive, complicated machinery. Their social instincts are strong, and these must be reckoned with when the

Italian is ready to buy a farm. It may be asserted that the primary reason for the Italian's choice of truck and vegetable gardening in preference to diversified farming is a social one: he can have both land and neighbors. Some have said that the Italian is a gardener here because he was a gardener in Italy. Doubtless his early farm practice exerts some influence on his later choice, but investigation has plainly shown that a compact group of Italians can carry on successfully almost any system of farming and that the isolation of a few families is likely to mean failure even in the midst of favorable natural conditions. The South Italians, especially, run in groups and follow a leader.

Climate and physiography play a much smaller part in the ultimate success of Italian colonies than is generally supposed. South Italian colonies are found all the way from the pine lands of northern Wisconsin to the cane fields of Louisiana. While sentiment often has much to do with the choice of a location, it cannot be said that the success of the settlement at Genoa, Wisconsin, is due to the Alpine aspect of the topography rather than to the excellence of the soil and the favorable markets; nor that the fine North Italian settlers of Valdese, North Carolina, would not have made more progress in every way had they settled nearer markets and on level land where there was more fertility and less Swiss scenery.

The Italians have introduced into agriculture little that is new, but in the North, in every instance, their communities have enriched and improved the land and increased the agricultural wealth of the surrounding neighborhood. They seem to love the land, and few farms in the localities studied have retrograded under Italian management. Ownership is the almost universal form of tenure in northern settlements of North Italians, and but few South Italians rent the farms they operate. Having once purchased a piece of land on time, the Italian works early and late to pay for it and make it productive. In numerous instances he has, by an incredible expenditure of labor, made productive land which native farmers considered worthless. When the native farmers in the older colonies have suffered from low prices and a general agricultural depression, Italians have been ready to purchase abandoned or semi-abandoned farms, often subdividing them and restoring their productiveness. This movement has not assumed significant proportions, so far as Italians are concerned, but in New Jersey the further extension of the settlements seems likely to proceed by this means.

At the South, the displacement of negro farm labor by the Italian has not yet attained significant proportions, quantitatively. The reports on the Sunnyside and the "delta" settlements make clear the Italian's superiority over the negro, and the high regard in which he is held by the cotton planter in almost every instance. Not many negroes have been displaced, but the greater efficiency of the Italians assures them places as share hands or renters as fast as they come to demand them. Nowhere are the Italians held in higher esteem as farm laborers than among the large cotton planters in the delta region. Here they are raising successfully and profitably a crop of which they knew nothing previous to emigrating and for which it cannot be said that they had any natural aptitude. The influx to the cotton belt is slow, but this sluggishness is not due to lack of encouragement on the part of the planters. There is little doubt that the immigration will continue, but at the present rate there is no immediate prospect of the Italian's forcing out the negro. There is also an increasingly large movement of Italians, mostly Sicilians, into the sugar-cane region.

65. ASIATIC LABOR ON THE PACIFIC COAST[1]

By H. A. MILLIS

Though a few thousand Armenians are found in the West, most of them in Fresno County, California, and perhaps a thousand Syrians in Los Angeles, most of the Asiatic immigration has been from Eastern Asia—China, Japan, Korea, and India. According to the census, the number of Chinese in the continental United States in 1900 was 93,283. Of these, 88,758 were males and 4,525 were females. In all probability the number of adult males was somewhat larger than the figure reported, but it has become evident from the investigations of the Commission that the number of Chinese in the West has materially decreased within the last decade or so.

The immigration of Chinese laborers to this country may be said to date from the rush to California in search of gold sixty years ago. Many engaged in unskilled work in mining, railroad building, salmon canning, and in domestic service, laundries, and shops. Of still greater importance, however, was their employment, beginning previous to 1870, as hand laborers in the orchards, fields, hopyards, and vineyards of California north of the Tehachepi, and in the canneries and other establishments incidental to the conserving and marketing of the crops produced. They did most of the hand work, such as

[1] Adapted from *Reports of the Immigration Commission*, Vol. I, 654–82.

hoeing, weeding, pruning, and harvesting, in all localities in the central and northern part of the state in which intensive farming was carried on. Being inefficient with teams, and white men being available for such work in most localities, they were practically limited to hand work. They found favor in many instances because of the fact that they provided their own subsistence where white men, if they did not live close at hand, would have to be provided with board. Lodgings were easily provided for the Chinese, who are less dissatisfied when "bunked" in small quarters than is any other race thus far employed in the West.

The Chinese engaged in agriculture were very largely replaced by Japanese. The Chinese engaged in the growing of sugar beets were underbid and displaced by the more progressive and quicker Japanese and have all but absolutely disappeared from the industry. In the hop industry the Japanese underbid the Chinese as the Chinese had the white men. The same is true in the deciduous-fruit industry, though Chinese lease orchards and in almost every locality are employed in comparatively large groups on some of the older ranches. The largest amount of land is leased by them and the largest number of them are employed for wages in the orchards and on the large tracts devoted to the production of vegetables on the Sacramento and San Joaquin rivers. Migration from place to place for seasonal work has become rare. Moreover, as the Japanese have advanced, the Chinese have leased fewer orchards and withdrawn to grow vegetables or have gone to the towns and cities. Though the number employed in agricultural work is by no means small, they are no longer a dominant factor in the labor supply and especially in that required for harvesting the crops.

Until 1898 the number of Japanese immigrating to the continental United States had never reached 2,000 in any one year. From 1899–1900 to 1906–7 the number varied between 4,319 and 12,626 per year, and from the beginning of 1902 to the end of 1907, 37,000 came from the Hawaiian Islands to the mainland. The influx of Japanese laborers has been controlled and reduced to small proportions during the last two years by a series of measures which permits the greater part of the administrative problem to rest with the Japanese government.

Like the earliest immigration of the Chinese and the present immigration of most of the south and east European races, the majority of the Japanese immigrants have been of the agricultural

class—small farmers, farmers' sons, and a few farm laborers. Several circumstances have militated against the success of Japanese in industrial pursuits, and many who found their first employment in the canneries and as section hands and general construction laborers have shown a strong tendency to leave such employment for agricultural work or for occupations in the cities. It may be said further that none of these industries, save salmon canning, has been materially assisted by or has become dependent upon Japanese labor. With the beet-sugar industry in several states and certain other agricultural industries in California it is different, for the farmers in many localities have for years relied upon Asiatic labor until a situation has developed in which the substitution of other races will involve inconvenience and will require radical changes in order to make the necessary adjustment.

In 1909 it is probable that not far from 30,000 Japanese were engaged in agricultural pursuits in California during the summer months. As laborers they occupy a dominant position in most of the intensive, specialized agriculture which has come to prevail, and especially in that which involves much hand work and is seasonal in character. The Japanese do practically all the hand work in the berry patches, two-thirds of that in the sugar-beet fields, perhaps one-half that in the vineyards, and a somewhat smaller part of that in the fields devoted to raising vegetables and in the orchards. In the hop-yards they do not generally predominate except in the training and care of the vines and in picking in some localities, while on general farms they find little employment. On farms conducted by white men they do very little of the work with teams and have as their share the smaller part of the hand work in vineyards and orchards except during the busiest seasons, whether during cultivation or harvest, when they occupy a much more conspicuous position, and their dominancy is in part due to this fact.

Because of differences of climate, elevation, and soil, much specialization in farming has developed where the problems of transportation and labor could be solved. First the Chinese and then the Japanese have been organized and easily moved from one community to another, so that no great restriction has been placed upon a specialization which has called for many laborers at one time and relatively few at another. Many California communities have a degree of specialization in agriculture which makes it necessary to induce many persons to come from other localities to assist for a time in the

farm work. The need is made all the greater by the fact that in marketing the products frequently much additional labor is required to "man" packing houses, canneries, or wineries. At Vacaville 4,000 persons must come from other localities to assist in picking, packing, and drying the fruit. At Watsonville 2,000 laborers are required from other localities to assist with the strawberry and apple harvests, which are separated by a period of many weeks. At Fresno from 3,000 to 4,000 extra laborers are needed for three weeks in the autumn to harvest the raisin grapes, while others are required in the packing houses and wineries. About Oxnard for several weeks 2,000 extra men are needed. Instances are fairly general of a specialization by communities which requires for a time a labor force larger than that which is normally supported by the community. The problems thus indicated the Chinese and Japanese have solved. They are accustomed to hand labor, have usually been without family, and could easily migrate from one community to another; have been provided with comparatively cheap lodgings and have boarded themselves, when white men, as a rule, must be provided with board; and have been organized so that it was possible for the grower to secure the number of men desired, and have them supervised and paid off and discharged, as a group, by the "boss" of their own nationality.

The Japanese agricultural laborers were at first almost all of the migratory class engaged in seasonal work only. Gradually, however, an increasing percentage of them have found employment in the same locality throughout the year. A small percentage, also, as among the Chinese, have come to engage in occupations requiring work with teams. Most of these, however, are farming for themselves or are employees of farmers, for among the Japanese, as well as Chinese, Italians, and Portuguese, there is a strong tendency to employ only persons of their own race to fill all positions.

Within ten years the Japanese have become conspicuous as farmers. In California, according to the returns made to the secretaries of Japanese associations, which, where checked, have been found to be approximately correct, the members of this race in 1909 owned 16,449½ acres of agricultural land and leased 137,233½ more, 80,232 acres of it for cash and 57,001½ for a share of the crop. This does not include so-called "contract leases," where a part of the work involved is covered by a contract for the season or a period of years. The amount of land controlled by Japanese in several other states in the West was in 1909 approximately as follows: Colorado, 20,000

acres; Idaho, 7,072; Utah, 6,000; Washington, 7,000; Oregon, 3,500; more than 90 per cent of it being under cash or share lease.

Though in many localities the Japanese were at first received with great favor, widespread dissatisfaction with them is now found and they are almost always disparagingly compared with the Chinese, who, because they are careful workmen, faithful to the employer, uncomplaining, easily satisfied with regard to living quarters, and not ambitious to learn new processes and to establish themselves as independent farmers, are used in the older agricultural districts as the standard by which others are measured. Though many ranchers think that for social reasons it would be a mistaken policy to readmit the Chinese, they generally regard Asiatic laborers as indispensable to the prosperity and expansion of the agricultural industries which have become predominant, and their almost unanimous preference is for Chinese rather than any other Asiatic race.

The immigration of East Indian laborers may be said to date from 1905, and the number of such laborers in the United States July 1, 1910, may be estimated at 5,000 or perhaps a little more. About 85 per cent of these are Hindus wearing the turban; the others are Mohammedans or Afghans. Of 473 East Indians from whom personal schedules were obtained, 85 per cent had been farmers or farm laborers in India. While many of them have been employed for a time on rough work in lumber yards, railroad construction, or as section hands, most of them have drifted into agricultural work in California, where there has been the greatest dearth of cheap labor because of the extension of specialized farming and fruit growing and the diminishing number of Chinese and Japanese available as wage laborers for seasonal work. In 1908 they made their appearance in orchards, vineyards, and sugar-beet fields, and on the large farms devoted to the production of various kinds of vegetables in northern and central California. In 1909 three small groups made their appearance in southern California. Their work has been of the most unskilled type, and limited to hoeing and weeding in field and orchard, and to harvesting of grapes, fruit, and vegetables. In only one or two instances were they found to have been employed with single-horse plows. In the Newcastle fruit district and along the Sacramento and San Joaquin rivers, where a large part of the land is leased by Asiatics, they have found employment without much difficulty because of widespread desire to break the monopoly control of the labor supply by the Japanese or because of the much higher wages than formerly

commanded by other Asiatics. In 1908 their wages varied from 25 to 50 cents per day less than was paid to Japanese. This difference has tended to disappear, however; for the East Indians, when they have found employment in a community, have demanded as high wages as were paid to other Asiatics. Though in some instances they have commended themselves to ranchers, they have generally been regarded as distinctly inferior to laborers of other races and as not cheap labor at the wages which they have been paid. Usually they have done the work not desired by other races or have been employed when other laborers were not available at the customary or even a higher wage.

66. STATISTICS OF NEGROES IN AGRICULTURE[1]

The accompanying table presents the principal statistics of agriculture for negro and for white farmers in 1910 and in 1900 for the United States as a whole.

TABLE I

	Farms: 1910 and 1900			
	1910		Percentage Increase:* 1900–1910	
	Farms Operated by Negroes	Farms Operated by Whites	Farms Operated by Negroes	Farms Operated by Whites
Number of farms	893,370	5,440,619	19.6	9 5
Acreage, total	42,279,510	832,166,020	10.6	4.4
Per farm	47.3	153.0		
Improved acreage, total	27,845,190	449,418,265	19.2	15.2
Per farm	31.2	82.6		
Tenure:				
Owners and part owners	218,972	3,707,501	16.6	7.6
Tenants	672,964	1,676,558	20.8	14.4
Managers	1,434	56,560	−17.8	−1.2
Value:				
Total	$1,141,792,526	$39,712,214,845	128.4	99.6
Land	756,158,264	27,615,515,334	133.2	117.3
Buildings	166,559,439	6,148,876,853	131.6	76.7
Implements and machinery	34,178,052	1,227,407,744	81.2	68.4
Live stock	184,896,771	4,720,414,914	117.7	58.6
Value per farm	1,280.75	7,299.21	91.3	82.3
Value per acre	27.01	47.72	106.9	91.1

* A minus sign (−) denotes decrease.

[1] From "Negroes in the United States," *Bulletin 129, Bureau of the Census Department of Commerce*, pp. 36–39.

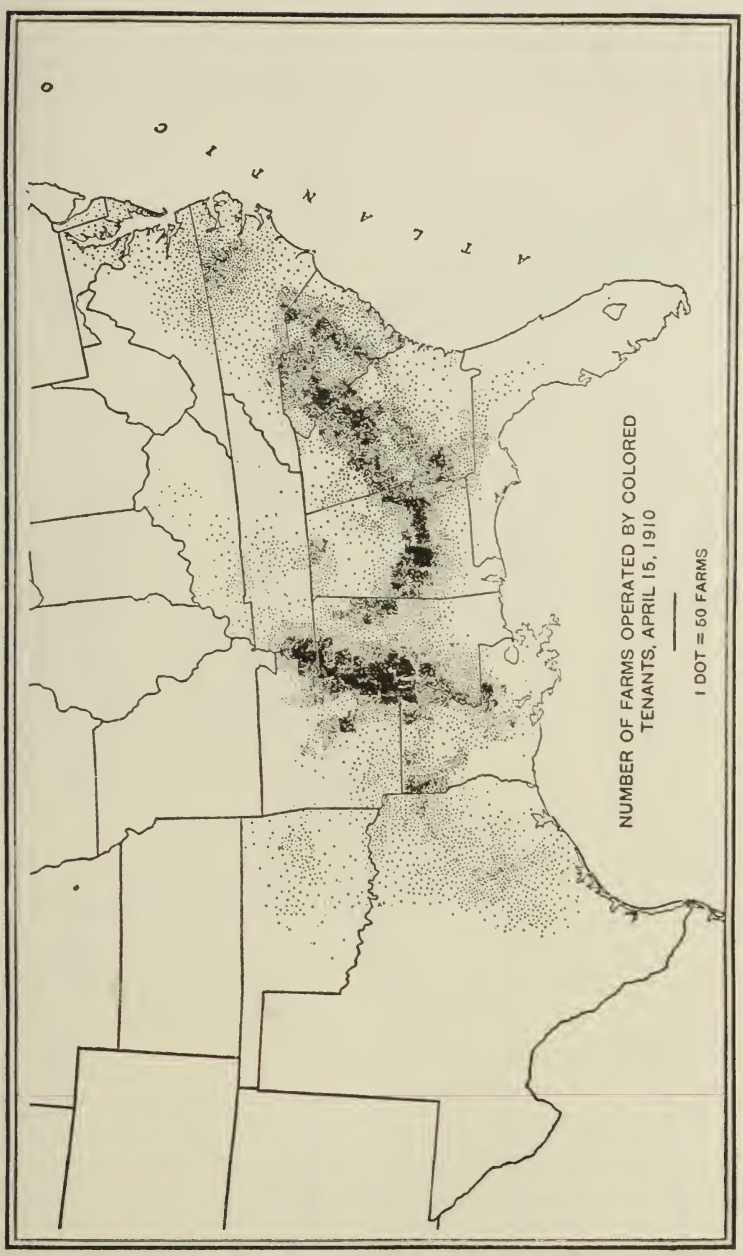
There were 893,370 negro farm operators in 1910 and 5,440,619 white farm operators, the negro operators forming 14 per cent of the total number, a considerably greater proportion than the proportion of the negro population to the total population of the United States, which was 10.7 per cent. The number of negro farm operators increased 19.6 per cent between 1900 and 1910, while the number of white farm operators increased 9.5 per cent.

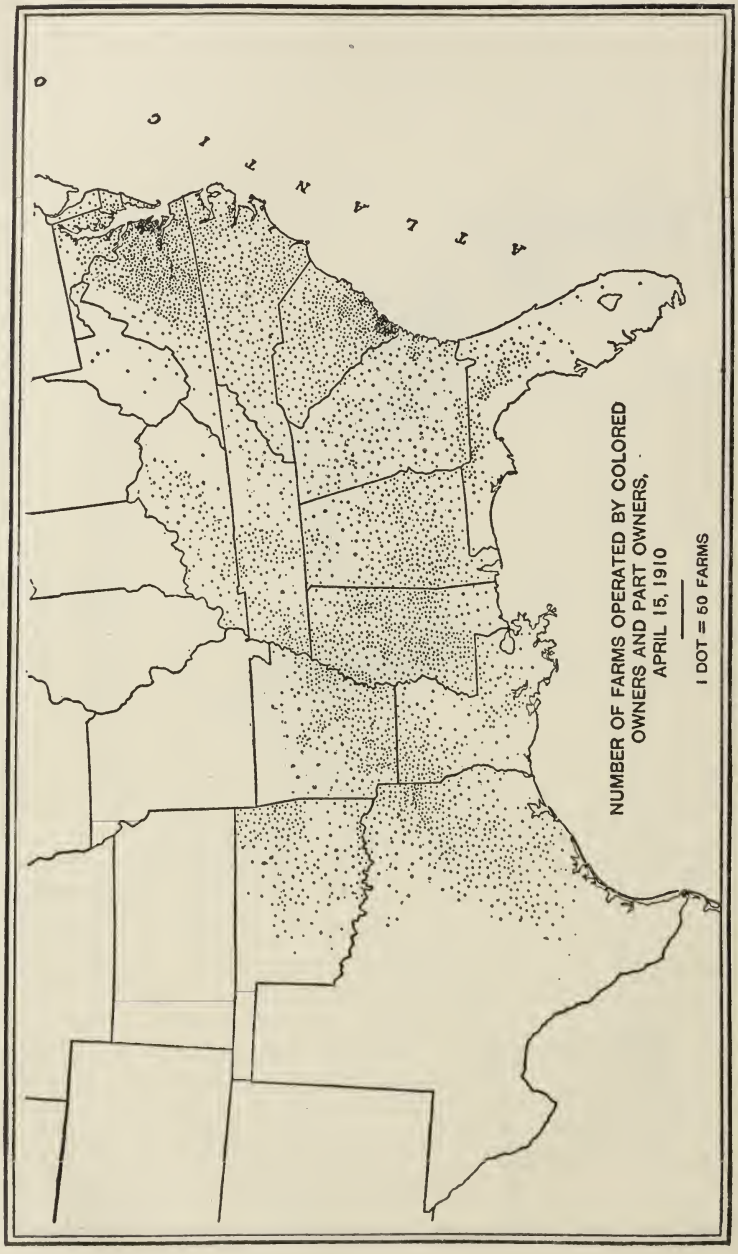
The total acreage of farms operated by negroes was 42,279,510 in 1910, the average per farm being 47.3 acres, as compared with an average of 153 for the farms operated by whites. The average improved acreage of negro farms was 31.2, as compared with 82.6 for farms operated by whites.

The total value of farm property operated by negroes in 1910 was $1,141,792,526; in 1900 the same item was $499,941,234, so that there was an increase of 128.4 per cent during the decade, while the value of farm property operated by whites increased 99.6 per cent. The value of implements and machinery on farms operated by negroes increased 81.2 per cent during the ten years 1900-1910, the value of live stock increased 117.7 per cent, the value of buildings 131.6 per cent, and that of land 133.2 per cent. The difference in the rate of growth between farms operated by negroes and by whites is greatest when value of live stock is considered, the rate of increase being only 58.6 per cent on farms operated by whites, as compared with 117.7 per cent on those operated by negroes.

The average value of farms operated by negroes in 1910 was $1,280.75, as compared with an average of $669.52 for 1900, and of $7,299.21 for farms operated by whites in 1910; the average value of farm property per acre was $27.01 on farms operated by negroes in 1910, as compared with $13.08 for 1900, and $47.72 for farms operated by whites in 1910.

Of the 678,118 colored farm tenants, more than one-half, 373,551, were share tenants; 14,623 were share-cash tenants; 264,443 were cash tenants; and for 25,501 the nature of tenancy was not reported. The number of colored share and share-cash tenants combined increased 36.3 per cent between 1900 and 1910, while the number of colored cash tenants and unclassified tenants combined increased 5.6 per cent. It is fair to say, therefore, that share tenancy is the predominant form of agricultural tenancy for colored farmers and apparently its numerical importance is increasing.


NUMBER OF FARMS OPERATED BY COLORED TENANTS, APRIL 15, 1910
1 DOT = 50 FARMS


NUMBER OF FARMS OPERATED BY COLORED
OWNERS AND PART OWNERS,
APRIL 15, 1910
1 DOT = 50 FARMS

In Table VI the number of farms and the value of farm property operated by negroes in southern states are given for 1910 and for 1900, with the increase for the decade and rank of the states at each census.

TABLE VI

State	Farms in the South Operated by Negroes					
	1910	1900	Increase* 1900–1910	Percentage Increase:* 1900–1910	Rank of States	
					1910	1900
	Number of Farms					
Southern states....	880,836	732,362	148,474	20.3		
Mississippi.....	164,488	128,351	36,137	28.2	1	1
Georgia.....	122,554	82,822	39,732	48.0	2	4
Alabama.....	110,387	94,069	16,318	17.3	3	2
South Carolina....	96,772	85,381	11,391	13.3	4	3
Texas.....	69,816	65,472	4,344	6.6	5	5
North Carolina....	64,456	53,996	10,460	19.4	6	7
Arkansas.....	63,578	46,978	16,600	35.3	7	8
Louisiana.....	54,819	58,096	— 3,277	— 5.6	8	6
Virginia.....	48,039	44,795	3,244	7.2	9	9
Tennessee.....	38,300	33,883	4,417	13.0	10	10
Florida.....	14,698	13,521	1,177	8.7	11	11
Oklahoma.....	13,209	6,353	6,856	107.9	12	13
Kentucky.....	11,709	11,227	482	4.3	13	12
Maryland.....	6,370	5,842	528	9.0	14	14
Delaware.....	922	817	105	12.9	15	15
West Virginia.....	707	742	— 35	4.7	16	16
Dist. of Columbia.	12	17	— 5	— 29.4	17	17
	Value of Farm Property					
Southern states....	$1,083,658,351	$469,506,555	$614,151,796	130.8		
Mississippi.....	187,401,976	86,390,974	101,011,002	116.9	1	1
Georgia.....	157,870,357	48,698,931	109,171,426	224.2	2	3
South Carolina....	118,314,985	43,992,879	74,322,106	168.9	3	5
Texas.....	111,853,611	56,180,207	55,673,404	99.1	4	2
Alabama.....	97,261,114	46,908,811	50,352,303	107.3	5	4
Arkansas.....	87,119,083	34,191,174	52,927,909	154.8	6	7
North Carolina....	78,675,830	28,458,176	50,217,654	176.5	7	8
Louisiana.....	56,472,403	37,995,093	18,477,310	48.6	8	6
Virginia.....	54,651,043	24,490,106	30,160,937	123.2	9	10
Tennessee.....	54,073,706	26,735,588	27,338,118	102.3	10	9
Oklahoma.....	30,347,738	7,313,156	23,034,582	315.0	11	13
Kentucky.....	18,252,353	10,950,268	7,302,085	66.7	12	11
Florida.....	15,365,896	6,466,487	8,899,409	137.6	13	14
Maryland.....	12,249,019	8,208,572	4,040,447	49.2	14	12
Delaware.....	2,350,845	1,393,830	957,015	68.7	15	15
West Virginia.....	1,304,721	827,711	477,010	57.6	16	16
Dist. of Columbia.	93,671	304,592	—210,921	—69.2	17	17

* A minus sign (—) denotes decrease.

67. DECLINE IN WOMEN'S WORK[1]

By GEORGE K. HOLMES

The outdoor labor of women on farms has undergone immense reduction within a generation or two. In 1871 this department investigated the subject in all parts of the country, with results that may be found in the report of the Commissioner of Agriculture for 1871. The summary of that investigation is printed below:

In New England very little regular labor in the fields is performed by women. The variety of indoor employments is such as to furnish work of a light and varied character, requiring every degree of skill. Yet in haying, laborers being scarce, the wives and daughters of farmers sometimes aid in spreading and raking hay. In planting, in a few cases girls are wont to aid in "dropping" corn or other seeds planted in hills or drills.

Women sometimes assist in milking, but not so generally as in former generations. In the care of poultry they still have by far a greater share. One report states that in some districts in Vermont one-twentieth of the farm work is done by women. In Lincoln County, Maine, the correspondent writes that "female outdoor labor is unknown—incompatible with New England institutions."

Girls are almost exclusively employed in hop picking wherever hops are grown, their nimble fingers rendering them superior to men or boys; but they usually receive but one-fourth the wages of men in the hopyard. In Barnstable County, Massachusetts, the work of setting out cranberry vines, weeding them, and picking the fruit is mostly done by women, and they obtain for setting and weeding 10 to 12 cents per hour, the same rate paid to men, and $1\frac{1}{2}$ to 2 cents per quart for picking, in which they average $1\frac{1}{2}$ bushels per day. Women are more efficient than men at this labor.

Canadian women, and occasionally Irish, hire out or work on shares in different parts of New England, though the number employed is not large, and they will undertake nearly all kinds of farm work. "Many of them are as smart as the men," but as a rule they are less efficient and receive proportionately less pay.

Similar customs prevail in New York, comparatively little outdoor service being rendered by American-born women. In tying hopvines and picking hops, in which celerity in digital manipulation

[1] Adapted from "Supply of Farm Labor," *Bulletin 94, Bureau of Statistics, United States Department of Agriculture*, 1912, pp. 27–28.

is a winning accomplishment—an occupation that is substantially an industrial picnic—they are universally preferred and are paid "by the job," or according to the measure of work done. In picking grapes and other fruit, and in packing fruit for market, they excel, and in some districts find agreeable employment in such service

Most of the berries of New Jersey, grown so extensively for the markets of New York and Philadelphia, are picked by girls and women at a given rate per quart, and they often make more than men at the same employment.

In many districts of Pennsylvania very little outdoor employment is undertaken by women, while in others, especially in those less improved, or with a large foreign element in the population, much and various farm work is done by women. In Butler County, which has a large immigrant element, "the women assist in every outdoor operation in which they can make themselves useful, so far as their spare time from the kitchen and dairy will permit, while their comfortable homes show that they do not neglect their household duty." These immigrants "not only do not lose their habits of industry, but are stimulated by the prospect of being able to accumulate enough to educate their children and for sickness and old age." Agricultural machinery is reducing the proportion of female labor required in harvesting, yet a woman may occasionally be seen driving the teams which are the motive power in reaping and mowing, and one who can bind or gather grain with celerity and skill is not difficult to find. The assistance of women in outdoor work is enjoyed in Delaware, especially in "saving corn fodder," which is much used as a substitute for hay, and in picking peaches for market. The wages paid to women is said to be three-fourths of the rate allowed to men, and "their efficiency is in the same ratio."

Among the poorer classes of whites in some counties in Maryland, the Germans especially, the women assist in such labor as planting, hoeing corn, weeding tobacco, and raking grain. Sometimes they obtain men's wages, but usually about three-fourths as much. In such work they are often quite as efficient as men. Negro women have been accustomed to all kinds of farm labor, though generally employed in the lighter branches.

Women assist in farm labor to a very limited extent in Virginia. Since the war, negro women object to field work. Very generally, however, the "small farmers" have occasional assistance from wives and daughters in most of the branches of service enumerated in the

record of woman's work in other states. They are especially useful in "worming, suckering, and stripping tobacco," often more efficient than men, but receiving only one-half to two-thirds as much pay. In some counties full wages are paid for work in planting and gathering corn; full pay is often given binders in the wheat harvest who can keep up with the reaper. In Nelson County, "some are expert at crating and seem pleased with it, regarding it as more or less of a frolic."

Through the southern states a large portion of the females among the negroes were accustomed to general farm labor, most of whom now decline it, appearing to regard it as a relic of slavery and not "suited to ladies." It is stated of some states that not more than a fourth part as many do outdoor work as formerly.

White women in North Carolina, to a limited extent, render assistance to husbands and fathers who do their own farm work. In some districts of South Carolina it is said that "20 per cent of the farm labor is performed by women, black and white." On an average they are not paid more than half the wages of men, and their efficiency is in the same ratio.

Very little farm work is done by women in Georgia, the women never hiring out, except in some instances at cotton picking. Yet there are instances reported, as in Cherokee, in which "a few widows manage their farms without any adult males to help; and they plow, hoe, harvest, bind, and gather their crops, shear sheep, and carry on all farming operations." Similar cases are found in all the Gulf states. In the harvesting of the cane, and in the operations of sugar making, female labor is found efficient; while, in another state, a crusty bachelor maliciously hints that the agricultural occupation preferred by women in his state is "raising Cain."

A large portion of the gardening of Duval County, Florida, is done by women. In Louisiana, Mississippi, and Alabama white women upon small farms assist in field occupations more than formerly. Picking cotton is preferred, and when women are employed for wages the pay is proportionate to the work accomplished. Occasional aid in the light work of the farm, as cotton seeding or cotton picking, is given in Texas, Arkansas, and Tennessee.

Among the rich lands and large farms of Kentucky very little outdoor work is done by women, either white or black; but in the less opulent hill regions white women do more farm work and black women less than formerly. In Missouri, where the same general

statement holds good, it is said that "one woman in a garden or at the sorghum kettle is considered equal to two men."

Very little farm work is done by native American women in all the states of the Ohio Valley and the Lakes, that little being casual assistance in emergencies as a matter of convenience and sometimes of necessity, as is reported of all other sections of the country. Gardening and fruit picking are preferred, and hop picking where hops are grown. Immigrants do more outdoor work, "especially for a few years after coming here. As they become more Americanized they work less on the farm." "They do all kinds of farm work," says a correspondent in Wisconsin, "and many kinds as well as the men." As hop pickers in the Northwest they are preferred to men and secure the same pay, but for most farm work do not receive more than one-half to two-thirds of the wages of men.

In Minnesota female immigrants work extensively in all branches of farming. "In binding and shocking grain, some of them are equal to the best of men." Some of them, in time of scarcity of labor and high rate of wages, have received $2.50 to $3.00 per day, when male laborers obtained $3 to $3.50 per day.

In Kansas the kitchen garden is generally in charge of the mistress of the farmhouse. But when employed for wages, women get about the same as men for the same amount of work, though this is not invariably the case. In some counties of Nebraska no outdoor work of women is reported; in others much is done in haying and harvesting; some can bind as much wheat as men, "though they cannot bind it so tightly," in which cases they get the same pay for it. A correspondent says, "The day has passed in progressive Nebraska for the 'weaker vessel' to get less pay than men for the same work." In Utah it is claimed that women do not generally work out of doors. One report admits that women assist occasionally at harvest, and that they receive half the rate of wages paid to men. Less farm work is done by women in the Pacific states than elsewhere, on account of their comparative paucity of numbers.

With regard to very recent years census statistics of female agricultural labor afford no satisfactory conclusions. A general knowledge of farming conditions throughout the country, past and present, is more definite. Farmers' wives and daughters no longer milk the cows and work in the field and care for the live stock. They do not work in the kitchen garden as much as before, nor assist so much in fruit and berry harvest; they are making less butter, and cheese

making on the farm has become a lost art. They may care for the poultry and the bees, do housework and gather vegetables for the table, and cook and keep the dwelling in order. Their domestic work is substantially the limit of their work on the farm.

C. The Question of Efficiency

68. WHAT THE FARMER NEEDS TO KNOW[1]

By G. F. WARREN

Some persons, who may succeed well in the very specialized callings in the town or city, may not be qualified for farming, for farming calls for such versatile ability. The farmer is a combination of business man, mechanic, naturalist, and laborer.

In the days of our fathers the measure of the farmer's success was his ability to raise his own food and clothing rather than his ability to organize his business and buy and sell. But today the farmer no longer supplies his own needs. He sells most of his products and buys most of his necessities. Not only must he have money to buy the innumerable necessary things for his living and equipment, but land, which was once to be had for the asking, is now dear. All these changes mean that the farmer has become a business man. The kind of business ability needed is not so much that of the trader as of the executive who can organize a farm into a successful business enterprise. The idle horse in the barn is a more frequent source of loss than is the bad bargain in buying a horse. More farmers fail because of poor farm management than because of poor production.

Mechanical ability has always been desirable for a farmer, but in the last twenty years the great increase in the number of complicated machines has made this ability of much more importance than formerly. Grain and corn binders, manure spreaders, potato diggers, gasoline engines, and all the other new and expensive machines call for mechanical ability if they are to be used efficiently. There is something to farming besides taking a pleasure drive with a team of fine horses on one of these machines. A little carelessness or inexperience may cause a loss of more than a month's wages. Occasionally a farmer can depend upon hired men for his mechanical ability, but usually he must not only be the mechanic, but must instruct the men

[1] Adapted from *Farm Management*, pp. 1–5. (Copyright by the Macmillan Co.)

and guard against their carelessness. There are still some kinds of farming in which machinery is little used, but more and more the farmer-mechanic with his machine is replacing the hand laborer.

The farmer has ever been a naturalist. He used to conspire with the moon and the almanac to coax nature to yield a bountiful harvest. Today he may learn from the experiences in other states and countries and from scientific investigation. If a farmer is to compete with his neighbors, he must study the science of plant and animal production. If he takes a keen delight in watching plants and animals thrive it will add much to his pleasure and, if tempered with good judgment, will go far toward bringing success.

A generation ago the farmer was primarily a laborer. His few machines were all muscle testers. Physical strength and physical skill were among the greatest assets, and they will always be important considerations for the farmer. The prospective farmer who is skilful with his hands and likes to do manual labor has two of the very desirable traits for a farmer.

69. FARMING DEMANDS EXPERIENCE AS WELL AS KNOWLEDGE[1]

By G. F. WARREN

Many persons, who are not closely in touch with farming, believe that the introduction of machinery has done away with the necessity for strength and skill in manual operations. Few people realize how hard it is to acquire this manual skill. The writer has had an opportunity to see the efforts of many city persons, and has been surprised to see how difficult it is to acquire manual dexterity. The children on the farm learn by years of practice. It takes thousands of efforts for the boy to learn to throw a baseball straight. Apparently it is just as difficult to learn to pitch hay. If this skill is acquired by ten years of practice in childhood, little is thought about it, but if it is to be acquired by a mature man, it is a serious undertaking. Milking, using a saw, using an ax, and a thousand other manual operations are hard for a grown person to learn; but if one has been used to manual labor so that he has trained muscles, new operations are not so difficult. Grown persons who have never learned to do manual work of any kind rarely become successful farmers. The time to train the muscles is when they are young.

[1] Adapted from *Farm Management*, pp. 4–7. (Copyright by the Macmillan Co.)

A successful engineer would not expect to buy a bank and become a successful banker without some experience in the business, yet many men feel that since they have made a success in the city they can start farming without any experience and expect to make a profit at once. There is probably no occupation in which experience is more necessary and in which so much time is required to obtain the experience. City industries are very specialized. Farming calls for experience with weather, diseases, insects, plant feeding, animal feeding, breeding, machinery, business affairs, and a hundred other things that it takes time to learn. The only safe way for an inexperienced man to begin farming is by working for a good farmer. If one begins for himself, he should put his theories into cold storage and follow the practice of the most successful neighbors as closely as possible for the first few years. Even then he will make mistakes enough. The worst mistake of all is to assume that the farmers are all ignorant and unbusinesslike. They are the fathers and brothers of our mighty "captains of industry" and are usually as efficient for their conditions as the successful city man is for his. Inexperience is so serious a handicap that farmers are very loath to hire anyone from the city except for very simple kinds of work, as picking fruit, picking up potatoes, weeding, and similar tasks.

If one desires to have a chance to learn all phases of farming, he should not expect much pay until he becomes of use. If an inexperienced person is allowed to use machinery and take care of stock and crops, the farmer is almost certain to have serious losses, unless he has another person to watch the beginner almost constantly.

70. MACHINERY NOT ENTIRELY A SUBSTITUTE FOR LABOR[1]

By CARL W. THOMPSON and G. P. WARBER

The importance of the increased use of machinery has been discussed. Attention has been called to the changes wrought by the introduction of such labor-saving devices as the self-binder, hay-loaders and stackers, self-feeders, and gasoline engines for pumping, churning, and washing, until it is believed by many people that machine processes have become so extended that the present-day farmer has but to sit around all day with a wrench and oil-can in hand, from the time he starts the milking machine going in the morn-

[1] Adapted from *Social and Economic Survey of a Rural Township in Southern Minnesota*, University of Minnesota Studies in Economics, No. 1, pp. 8–11.

ing until he turns off the switch of his electric power and lighting system at night. Although it is true that much of the heavy work on the farm has been made easier by the use of such machinery as the self-binder, the self-feeder on threshing machines, the manure spreader, and the riding plow, there are still many onerous tasks left. Machinery has influenced farm work greatly, but so also has the increase of live stock. This has made farm life more restraining and exacting.

We thus see how the increase of live stock on the farm represents an increase in the kind of work that cannot be reduced to machine process. But few people realize the importance of this labor situation as it presents itself to the farmer today. The census reports indicate how there has been a general increase of hired help in live-stock farming districts. In this township 15 per cent of the farmers had hired help by the year, 9 per cent had help by the month over four months but less than a year, 8 per cent by the month less than four months, and 34 per cent hired day labor. Of the total number of farmers 23 per cent found it their "biggest problem to get satisfactory help." There is more and more of a demand for the kind of laborers upon whom the farmer may depend absolutely. Besides physical strength, the present-day system of farming demands a willingness to work irregular hours and a genuine personal interest in the work on hand. Farmers who keep pure-bred dairy herds must have help the year around; and any kind of hired help will no longer do. The farm laborer must be a man who is painstaking and gentle in working with the herd. There is so much in this alone that some of the best breeders say "no milking machine, however perfect it may be mechanically, will ever be able to replace the human hand, just because of the productivity due to the friendly relation between the cow and the milker." Thus it is that, in the opinion of many, "the hired-help problem is the biggest problem confronting the farmer."

71. VOCATIONAL TRAINING IN THE RURAL HIGH SCHOOL[1]

By R. W. STIMSON

Agricultural education as a phase of vocational education is that form of vocational training which fits for the occupation connected with the tillage of the soil, the care of domestic animals, forestry, and

[1] Adapted from "The Massachusetts Home-Project Plan of Vocational Agricultural Education," *Bulletin of the United States Bureau of Education*, 1914, No. 8 pp. 9–19.

other wage-earning or productive work on the farm. Vocational agricultural education is, thus, one phase of effort toward conserving the valuable years of youth for the best uses of both society and the individual.

There is now a general movement throughout our country for agricultural education of secondary grade. There are probably not fewer than 500 secondary schools in which agriculture is now seriously taught. The training varies from the study of an agricultural textbook in the hands of the general teacher, who does not bring to her task any special training, to the out-and-out vocational school, where the teachers are specialists in agriculture.

Productive work of a high order of efficiency is coming to be considered the real test of all systems of vocational education of secondary grade. Particularly in vocational agricultural education it is coming to be accepted that the training must be such as to develop both skill and managerial ability. The competent farmer must be not only expert in the varied technique of his calling but also a sound and progressive business manager.

Neither skill nor business ability can be learned from books alone, nor merely from observation of the work and management of others. Both require active participation during the learning period in productive farming operations of real economic or commercial importance. In general, if there is a defect in the large agricultural schools which boys must leave home in large numbers to attend, and which, in order to secure adequate attendance to justify their cost, must apparently limit their training to six or eight fall and winter months, it is the defect of putting too great reliance on books and observation, to the exclusion during the intensive learning periods of active participation in the type or types of productive farming the boys intend to follow after graduation. Too great, one may almost say in the cases of many of the boys fatal, reliance is put on the ability of the students once well grounded in sound theory at the school to put that theory into successful practice on their own farms alone and unaided.

The problem, then, of providing for actual participation both as manager and as worker in productive farming, simultaneously with his classroom instruction, on the part of the boy in the agricultural school may fairly be looked upon as the most startling and stupendous problem in the great field of vocational education. How shall it be solved?

Massachusetts has developed a plan for the solution of this problem. A vocational agricultural school may be established by any

town or city, or by any group of towns or cities which may voluntarily form themselves into a district for this purpose. Evening-school classes in agriculture may be established by any school committee. State aid is given such schools to the extent of paying one-third the expense of maintenance.

Vocational agricultural departments may be established in selected high schools. The agriculture must be taught by a specially qualified teacher who gives his attention exclusively to agriculture. His vacation must be taken during the winter months, usually December, January, and February. He must continue his work throughout the summer. Little stress is laid on land or operations at the schoolhouse. Every possible stress is laid on the utilization of the land and equipment at the homes of the pupils; and it is the instructor's duty during the summer to supervise work prepared for in the agricultural classes, from seedtime to the securing of the harvest. In the cases of such departments, the state reimburses the communities maintaining them to the extent of two-thirds of the salary of the agricultural instructor.

A fundamental feature of the Massuchusetts plan is embodied in what has been termed "part-time work in agriculture." Part-time work in industrial education means that the student spends part of the time required for his training in the shop or manufacturing establishment and part of the time at the school building, both school and shop work, however, being intimately related and supplementary to each other. Part-time work as applied to agricultural education means that the student must spend part of the time required for his education in productive farm work, preferably at home, and part of his time at the school, the farm work and school study being closely correlated by the school at points selected from season to season or from year to year, and the farm work being given the highest possible educational value by competent school supervision.

The part-time-work plan reduces the cost of agricultural training of secondary grade so as to place effective training for the farm within reach of many communities which would otherwise be unable to secure it. Fifty departments in fifty groups of farms should cost no more than five large schools such as those found in other states. It obviates the necessity of sending the boy away from home in order to secure the benefits of agricultural training. The cost of living for the boy is less at home than it would be at a boarding-school. Parents who need the help of their boys are deprived of their services during

only a portion of the day. The plan also is proving to be wonderfully effective. Co-operative work between the school and the farm home is the most effective known means of trying out under the conditions of individual farms, over widely scattered areas, methods which have proved to be profitable elsewhere, as, for example, at the state agricultural college or experiment station. Such co-operation furnishes effective experimental means by which each boy can try out the merits of the farm home as an agency for producing profits when treated by the best known methods. The principles and methods taught by the school can be positively adapted by each boy to the economic conditions of the farm on which he may spend his working days.

An essential feature of the home-project or part-time plan of training is the consideration of cost at all points. The boy by this method learns first of all through his experience that there can be no product without cost and no profit without excess of receipts over all expenditures. After such an experience he will not be likely to undertake a new enterprise without a serious attempt to estimate accurately his probable profit. The boy is subjected to the prevailing economic conditions under which the home farm must yield a profit or loss at the end of each year of work. The methods by which the boy becomes on a small scale a farmer or business man for himself gives the project which he is carrying on and the school work in which he participates a reality not otherwise attainable.

72. FARMERS' CO-OPERATIVE DEMONSTRATION WORK[1]

By S. A. KNAPP

The aim of the farmers' co-operative demonstration work is to place a practical object-lesson before the farm masses, illustrating the best and most profitable methods of producing the standard farm crops and to secure such active participation in the demonstrations as to prove that the average farmer can produce better results. The paramount issue is how most wisely and effectively to aid all the rural people. If each farmer is shown how to produce twice as much to the acre as he now produces and at less cost, it will be a profit in which all rural classes will share and will be the basis of the greatest reform ever known to rural life.

[1] Adapted from *Circular No. 21, Bureau of Plant Industry, United States Department of Agriculture*, pp. 3–13.

How can the knowledge of better agricultural methods be conveyed to the masses in a way so effective that the methods will be accepted and their practice become common? For many years the United States Department of Agriculture, the agricultural colleges, the experiment stations, the agricultural press, the farmers' institutes, and the national and state bulletins upon agriculture have thrown light upon almost every topic relating to the farm. These have been of great assistance to farmers who are alert and progressive, but the masses, especially in the South, have scarcely been affected. There came a time under cotton-boll-weevil conditions when it was found necessary to reach and influence the poorer classes. The co-operative demonstration plan was then tested.

In country villages the banker, the merchant, and the editor join with the leading farmers of the section in indorsing the progressive plans of the demonstration work; farmers agree to follow instructions, and demonstration plots of one or more acres are located so as to place a sample of the best farming in each neighborhood of a county or district. There must be enough of these to allow every farmer to see one or more during the crop-growing period. The necessary work on the plot must be done by the farmer and not by a government agent, because the whole object-lesson is thereby brought closer to the people. The demonstrating farmer understands it better because he does the work and his neighbors believe that what he has done they can do.

Each month during the season instructions are sent to every demonstrator and co-operator, clearly outlining the plan for managing the crop. In addition, a local agent is expected to call on each demonstrating farmer monthly and explain anything not understood in the instructions.

Previous notice by letter is given to all the co-operating farmers in a neighborhood to meet the agent on a certain date at a given demonstration farm, where the crop and plans are thoroughly discussed. This is called a "field school" and has been marvelously effective in arousing local interest. At such meetings and on all occasions where the agents meet farmers, the fundamental requirements for good farming are discussed by the aid of notes sent out from the central office. In the course of these discussions it has often developed that the majority of small farmers had never fully complied with any of these rules. They thought they knew all about farming and charged their small product and failures to the seasons or the land.

One farmer at a public meeting in Alabama this year expressed his views as follows: "I was born in a cotton field and have worked cotton on my farm for more than forty years. I had usually raised one-half a bale on my thin soil and I thought that was all the cotton there was in it in one season. The demonstration agent came along and wanted me to try his plan on two acres. Not to be contrary, I agreed, but I did not believe what he told me. However, I tried my best to do as he said, and at the end of the year I had a bale and a half to the acre on the two acres worked his way and a little over a third of a bale on the land worked my way. This year I have a bale and a half to the acre on my whole farm. As a good cotton planter I am just one year old."

It is of the greatest importance to confine the work to a few standard crops and the instruction to the basic methods and principles which stand for the best results and to repeat this line of instruction on every occasion until every farmer works according to some system and knows the methods that make for success instead of charging failure to the moon, to the season, to the soil, or to bad luck. It requires several years so to impress these teachings upon the masses, even when supported by demonstration, that they become the general custom of the country. The first year a few try the plan on small areas; the second year these greatly enlarge the area and some of their neighbors follow their example; the third year possibly 40 or 50 per cent adopt some of the methods; and so work progresses by the force of demonstration and public opinion until its general adoption is secured.

Every step is a revelation and a surprise to the farmer. He sees his name in the county paper as one of the farmers selected by the United States Department of Agriculture to conduct demonstration work; he receives instructions from Washington; he begins to be noticed by his fellow-farmers; his better preparation of the soil pleases him; he is proud of planting the best seed and having the best cultivation. As the crop begins to show vigor and excellence, his neighbors call attention to it, and finally when the demonstration agent calls a field meeting at his farm the farmer begins to be impressed, not only with the fact that he has a good crop, but that he is a man of more consequence than he thought. This man that was never noticed before has had a meeting called at his farm; he concludes that he is a leader in reforms. Immediately the brush begins to disappear from the fence corners and the weeds from the fields; the yard fence is

straightened; whitewash or paint goes on the buildings; the team looks a little better and the dilapidated harness is renovated. Finally, the crop is made and a report about it appears in the county paper. It produces a sensation. A meeting is called by the neighbors and the farmer is made chairman; he receives numerous inquiries about his crop and is invited to attend a meeting at the county seat to tell how he did it.

He made a great crop, but the man grew faster than the crop. There can be no reform until the man begins to grow, and the only possible way for him to grow is by achievement—doing something of which he is proud. He is a common farmer. What line of achievement is open to him but doing better work and securing greater results on his own farm? As soon as the man begins to grow he will work for every rural betterment.

73. THE NEGRO AS A FARMER[1]

By C. E. ALLEN

It is the purpose of this paper to present the agricultural situation of the Black Belt of Alabama, by comparing it with the regions immediately adjacent to it, north and south, where white majorities of population are found and successful farming obtains.

In the countries of the Black Belt in 1910 there were 26,138 white farmers and 76,648 negro farmers cultivating 1,798,056 acres in cotton and 812,982 acres in corn. The average production of cotton per acre was 0.27 of a bale, and of corn 10.4 bushels per acre. The cotton acreage in 1910 was 51,840 acres greater and the corn acreage 140,614 acres less than in 1900. In the twenty-one White Counties there were 51,131 white farmers and 20,797 negro farmers cultivating 917,143 acres in cotton and 771,378 acres in corn. The average production of cotton per acre was 0.34 of a bale and of corn 11.4 bushels per acre. The cotton acreage was 203,880 acres greater and the corn acreage 102,594 less than in 1900.

Two significant facts stand out in these records: the per acre yield and the increase or decrease of acreage. As to the per acre yield, it is conceded by all who are familiar with the soils of the Black Belt and the White Counties that by nature the soils of the Black Belt

[1] Adapted from "Greater Agricultural Efficiency for the Black Belt of Alabama," *The Annals*, LXI (September, 1915, on "America's Interests after the European War"), 187–98.

are much more fertile and more adapted to the cultivation of the staples than the soils of the other regions, yet there is a smaller average yield per acre in the Black Belt. The reduced acreage of the Black Belt is due to the decline of rural population, as will be shown herein later, and not to turning the lands into other forms of agriculture. They are idle and vacant, turned in many instances into grass fields. In the White Counties, the increase is due to increase of rural population and to opening up new lands.

An analysis of the two groups of counties locates more definitely the causes of the smaller average yield per acre of the Black Belt. In the counties of the Black Belt in which the negro constitutes 62½ per cent of the population, the average yield of cotton per acre is 0.26 of a bale and 10.5 bushels of corn per acre; in those counties in which the negro constitutes from 50 to 62½ per cent of the population, the average yield of cotton per acre is 0.30 of a bale and 10 bushels of corn per acre. In the group of White Counties where the negro constitutes 37½ to 50 per cent of the population, the yield per acre of cotton is 0.34 of a bale and 11.4 bushels of corn; in the counties where the negro constitutes 10 to 37½ per cent of the population, the yield of cotton per acre is 0.35 of a bale and 11.5 bushels of corn per acre. These results are significant, for the negro in increasing majorities is found on the best soils of the state.

Scientific farming includes within its program not only actual agricultural results, but the whole life of the farm: improvement of soils, adequate farm buildings, new and modern implements and machinery. In the Black Belt the value of lands and buildings increased 88 per cent between 1900 and 1910 and the value of implements and machinery increased 69 per cent. In the White Counties the percentage of difference in the same items for the same period of time was: land and buildings, 150, buildings alone, 133, implements and machinery, 113—a percentage of difference in each item twice as great as in the Black Belt.

An analysis of the two groups of counties as to the above items also reveals striking results. In the counties of the Black Belt where the negro constitutes 62½ per cent of the population the improvements between 1900 and 1910 were: land and buildings, 75, buildings alone, 68, implements and machinery, 54; in the counties where the negro constitutes 50 to 62½ per cent of the population: land and buildings, 108, buildings alone, 107, implements and machinery, 93. In the White Counties where the negro constitutes 37½ to 50 per cent of the

population, the improvements were: land and buildings, 121, buildings alone, 102, implements and machinery, 96; in the counties where the negro constitutes 10 to 37½ per cent of the population: land and buildings, 171, buildings alone, 153, implements and machinery, 130. It is thus evident that agricultural production and farm improvements increase in a ratio inverse to that of the presence of negro population.

The real condition and spirit of agriculture are probably more accurately revealed in the movements of population. Between 1900 and 1910 the rural population of the Black Belt, if we exclude four border counties, decreased 37.1 per cent. Ten counties suffered an average loss of 8.3 per cent. In rural and urban population nine counties suffered a loss of white individuals; eleven counties suffered a loss of negroes. On the other hand, every county in the group of White Counties increased in rural population. The average increase for the group was 21.3 per cent in rural population. The entire white population, rural and urban, increased 19 per cent and the negro population 20.8 per cent.

Such is the agricultural situation in the Black Belt as revealed by the records—a low rate of production, low rate of farm improvements, and an actual decline in rural population.

74. RURAL ILL-HEALTH AS A CAUSE OF INEFFICIENCY[1]

By ALLEN J. SMITH

In 1901 and 1902 and 1903 the hook-worm formed the nucleus of a jest in talk and printed items; it was then the "lazy worm." The poor Southerner who harbored the worm was if anything incensed by the disgrace he felt was incurred by his becoming ignorantly its host. • But as time and experience confirmed and added to the earlier warnings, the real meaning of the insidious enemy to the district fastened itself in the public mind; and more than one paper earnestly urged the economic as well as the purely pathological importance of the disease.

Is there wonder that our southern states lagged in the march of American progress? There have been numerous causes which held back the fuller development only now beginning to open before us of this which is naturally the most desirable part of our whole country,

[1] Adapted from "The Economic and Biologic Aspects of Hook-Worm Disease in the Southern United States," *University of Pennsylvania Bulletin*, Fifteenth Series, No. 3, Part 5, pp. 286–90.

much of it valuable for its mineral resources, much of it fertile beyond imagination, all of it abounding in the natural advantages of forests and streams. The feudal agricultural system originally undertaken was outgrown even before the American Revolution; and abetted and was itself sustained by negro slavery, which worked its curse upon the land in so many ways. The Civil War, with the political reconstruction period, the fear of yellow fever and its occasional ravages, the constant menace of malaria, which killed or weakened all but the favored few who could command cinchona in the rich marshy districts; all these were factors. But among them uncinariasis (the hook-worm disease) stands with malaria as worse than war and the devastation of battles and worse than all the other pathogenic agencies in combination. Through the influence of one or both of these diseases the men and women of the South, bred from the best American Colonial stock, offspring of pioneers, with the blood of English gentry and Continental cavaliers in their veins, sank lower and lower in physical degradation and squalor; were derided and denounced as lazy and shiftless, and condemned in popular opinion as a disgrace and worthless. But in reality their languor was not the product of the balmy breezes or the luxurious bounty of nature, as often charged. These people were sick; some died. They did not themselves know their true state, and in the lethargy of the disease they were not interested enough to deny the wholesale charges against them. When spared by death and come to parenthood the sallow, hollow-faced weaklings created offspring who died or grew up in turn to inefficiency.

D. Incentive and Discouragement

75. GOOD AND BAD MANAGEMENT OF FARM LABORERS[1]

Universally we are running our farms with insufficient labor. As a consequence the work piles up and we push and sweat and fume. We work one man to death, hang his hide on the fence, and hire another. By working the land with insufficient labor we are thwarting all of our highest ambitions as farmers. We deplete the soil, retard development, impoverish the home life, break our own lives, and discourage the young and drive them from the soil, thus increasing the

[1] Adapted from "Rural Social Problems," *Fourth Annual Report of the Wisconsin Country Life Conference*, abstract of remarks of W. J. Dougan and W. M. Leiserson, pp. 3–5.

ranks of the consumers and decreasing and weakening the ranks of producers.

In January more farm hands are looking for work than can get jobs. In March the tide turns and there are not enough men to go around. What shall men do between times? Spend their little savings and trust to luck? Thus the character of the men who stay deteriorates, while good men refuse to remain in an occupation which offers no better future. As soon as work on the farms is organized, and employment is made steady for all the help, just so soon will a better class of laborers be attracted to the farm.

As the farm-owner wishes life to be free from eternal drudgery for himself and family, yielding the fruits of happiness, leisure, and culture, he would do well to consent and arrange to give the farm hand who shares the shelter of his roof a fair chance at these same benefits.

The mass of farm hands are realizing that they are to remain wage-earners and that they will not become independent farm-owners. This means that the farm hand is no longer willing to endure long hours with no recreation. Formerly he considered being a hired hand a temporary condition. He could stand anything then, for he looked forward to the independent life of a farm-owner. But with this hope gone, and with nothing to look forward to but a life as a hired hand, he wants that life improved. He wants regular hours, a chance for recreation, a good place to live in, and enough wages to maintain a family according to American standards. A three years' trial of a regular half-day off for each farm hand has been successful on Mr. Dougan's dairy farm. There are six hired men. One has Monday afternoon off, another Tuesday, etc. Whatever the emergencies, it is understood nothing shall interfere with this arrangement. On Sunday each man gets another half-day.

The tendency is to pay all men the "going wage." This keeps down ambition and encourages incompetency. There are men whose services are worth two or three times that wage, and others who are expensive help at half the amount. One may discriminate in this matter on the same farm and keep contented help, on two principles: The first is to pay as generously to labor as the income can possibly stand, and to increase this pay as business increases; the second is to distribute this pay according to experience, ability, and length of continuous service on the farm.

Some form of dividing profits with hired help is perfectly feasible. A system of arriving at an actual basis for such profit-sharing implies

a record of production and a record of sale. The system must be within the comprehension of the hired man if it is to enlist his interest at every step in the business process. Such a system might likewise be applied to the hired girl in the house. The English and Scotch plan of giving premiums and medals at agricultural fairs, to those who tend and fit the prize cattle, should be introduced into our county and state fairs.

76. TENANCY AS A CAUSE OF INEFFICIENT LABOR[1]

By C. E. ALLEN

In ante-bellum days the industrial system of the Black Belt was made up of the big plantations as the industrial units, and the dominant feature of these units was organization and management, which made this the region of supremacy in Alabama. In the adjustment of labor to the new conditions of freedom, however, this industrial organization was shattered. The negro was employed largely under two forms of tenancy: the renting system and the share system. Since the beginning of the system the renting negro has been without supervision and control. By the lien law he was able to obtain supplies from merchants of near-by towns, and being obligated for only so much rent, he farmed according to his own pleasure, with the result that the farm on which he worked consistently deteriorated. The ditches grew up with grass, the soil washed away, fences and houses decayed, roads went unkept, and there arose in the land the saying, "The negro renter's foot is poison to the soil." On the other hand, the share system has involved a degree of control by white men, close in some instances, indifferent in others. The white planters who remained on the plantation after the war employed largely the share system, sometimes a combination of share and renting. Under this system close supervision was necessary, else failure and ruin were certain.

77. THE STIMULUS OF FARM OWNERSHIP

It has long been a settled tenet of our agricultural philosophy that farm ownership has a beneficial effect upon the character of work done by the farmer. Our public-land policy has had this as one of its principal arguments, and much of the rural-credits discussion has run

[1] Adapted from "Greater Agricultural Efficiency for the Black Belt of Alabama," *The Annals*, LXI (September, 1915, on "America's Interests after the European War"), 193–94.

upon the same lines. It has been repeatedly pointed out that the man who owns the land upon which he works will work harder and more wisely; he will take pride in his work; and will be conscious of a lasting benefit to be received from every improvement in the character of his farming; conscious, too, that slovenly work or harmful methods will have a permanent effect in lessening the productivity of his labor in the future.

Undoubtedly this is in large measure true.[1] Still we have awakened of late to the fact that absolute ownership of the ground he tilled has also left the ignorant or careless farmer free to abuse it as he would. It is well to face the fact that much laziness and inefficiency has been tolerated among those who work our farms, simply because ownership of the land has meant that they could be neither controlled nor dispossessed. With the coming of a better knowledge of the science of agriculture we may expect to find the beneficial effect of ownership reappearing and its most conspicuous abuses tending to be eliminated.

78. INCREASING EFFICIENCY THROUGH JOINT ACTION[2]

If a merchant go into a new town to open a business, he need not feel entirely strange, for he is soon invited to join a chamber of commerce or a merchants' association, which, though recognizing the proper place of competition, attacks with vigor the problems which all merchants have in common. If a skilled mechanic move to a new city, he finds common ground in the labor union, and he does not feel alone. But for the farmer there is no organization that compares with the merchants' association or the trade union for strength of influence and efficiency.

To overcome this deficiency and to provide a competent organization, there is pending in the national Congress a joint resolution calling

[1] A recent survey of 272 owner farms and 179 tenant farms in Missouri (see *Bulletin 121, Missouri Experiment Station*) found that "one-tenth of the owner farms have acreage crop yields of less than 75 per cent of the average for the region, while one-fourth of the tenants are in this group." One-half of the tenants had "crop yields which are less than 90 per cent of the average yield for the region while only 30 per cent of owners fall below this line. The results as a whole show that the owner farmers rank higher in crop yields than do either part owner or tenant farmers."

[2] From *Report on Unemployment* of the Commission of Immigration and Housing of California, December, 1914, p. 23.

for the creation of a national marketing commission to be composed of twenty-nine members, fifteen of whom shall be farmers and fourteen of whom shall be selected with reference to their eminence in commerce, law, finance, and transportation, said commission to adopt a plan of action for the effective organization of the states, counties, and localities of the United States for the economic distribution of the products of the farm. The type of this proposed commission is the Landwirtschaftsrat of Germany. It is conceivable that such a semi-official body, taking the place in reality of all the so-called national farmers' organizations, would wield great power. Within its hands, and in the hands of the subordinate state, county, and local branches, could well be placed the solution of all those problems that today vex the unorganized farmer. From such an articulate body we should have the right to expect some aid in the solution of our problem of unemployment, through its co-operation with the proposed bureau of labor exchanges.

Therefore we trust that your Excellency will see fit to support the above-mentioned congressional resolution in such ways as you may deem wise, and that you will urge upon our state legislature to memorialize Congress to the same effect.

79. AN ASSOCIATION FOR BETTER FARMING[1]

By GEORGE W. BUSH

The county farm bureau has come to be known as a group of farmers in the county, organized for self-help, and is recognized as a local organization of farmers, formed for the purpose of providing necessary machinery for the co-operative effort of attacking the problems confronting the farmer and the farmer's wife. It is also the local headquarters, or clearing-house, for agricultural information and for the extension work of the College of Agriculture and the United States Department of Agriculture.

The aims of the farm bureau are many, the chief of which are as follows:

1. To assist in the federation of community interests. In all counties there are many local organizations, such as county fair associations, live stock breeding associations, granges, and various other associations, all striving in a more or less independent manner to better their conditions. How much more could be accomplished if

[1] *Bulletin of the Ohio State University*, Vol. XX, No. 6, pp. 54–56.

these independent interests were federated and striving together for certain definite desired objects. The purpose of the farm bureau is to co-ordinate these and get all working together as far as possible.

2. To help organize community interests already present. In every county there are undeveloped enterprises awaiting organization. For example, there is the general production of good seed—corn, wheat, oats, etc.—in sufficient quantities to develop a reputation for it, the breeding of horses for local use, and, in many cases, the improvement of dairy herds by the formation of cow-testing associations, community drainage associations, etc. There are many other projects, too, that need development. It is the purpose of the farm bureau to organize and assist these.

3. To give encouragement and aid in the development and formation of farmers' co-operative companies.

4. To study local conditions with an eye to helping adjust labor difficulties. In every community there are economic problems having to do with the cost of production, cost of transportation, productive investments of capital, labor scarcity, and the like, that often have a vital influence upon the agriculture of the county. Many of the bureaus assist in bringing the unemployed in touch with the employer on the farm, who, many times, is hard pressed for sufficient labor to carry on farm operations.

5. To demonstrate, where possible, better farm management. There is opportunity everywhere for better farm practices and more profitable systems of management. Oftentimes the adoption of farm practices that a change of conditions has brought about, practices that were unknown thirty years ago, will add materially to farm incomes. It is one of the functions of the bureau to point out, if possible by practical demonstrations and co-operation on different farms and with various farmers in scattered neighborhoods in the county, such of these newer methods as have proved their worth. For example, we may mention the more liberal use of lime in many cases, the better management of fruit trees, the improvement of the flocks and herds through live stock associations, etc.

6. To give personal assistance. This is, by all means, the most important. The farm bureau manager is called upon each day by letter, telephone, or personal visit to give advice on varied subjects and practices. In order to cover this, no man should be a farm bureau manager who has not had the experience acquired by several years of successful farm management, coupled with technical knowledge on

many different agricultural matters. Questions concerning drainage, tillage, seed treatment, spray mixtures, orchard renovation, fertilizer formulas, feed rations for farm animals, and many others relating to the newer farming methods are constantly being asked. These must be met by specific answers from the farm bureau manager, or from specialists on the different problems. While his usefulness rests more with his ability as an organizer of county affairs and as a demonstrator of successful practices, this last should not be forgotten.

V

CAPITAL-GOODS AS A FACTOR IN AGRICULTURAL PRODUCTION

Introduction

The economist who essays to give an account of the origin of capital may well use agriculture as his text. Our industrial evolution started with agriculture, and our account of the development of industrial equipment may well go back to the point where husbandry begins. Among the first primitive implements that men chose or fashioned from natural objects were the digging-stick, the harvester's basket, flint or bone hoes, fences to protect some spontaneous crop from animal depredations, or scarecrows and nets to safeguard them from thieving birds. To produce these goods the savage had to increase his labor beyond the limit demanded by mere subsistence. Instead of stopping work the moment his belly was filled, he must needs labor on, to fashion new equipment for tomorrow's labor. Or, when he had laid by enough of food to keep him from hunger during the unproductive season, he might not lapse into idleness. Dawning foresight urged him to gather and store yet more of seeds and grains and tubers that something might remain to be planted at the advent of the next growing season.

But capital is not born of this single parent. If Industry be the fecund father, Abstinence is not less the fostering mother. It has been suggested that the first animals to be domesticated were simply the few saved from an extraordinary catch, instead of being wasted in an orgy of feasting. Certain it is that when surplus crops had been garnered or when a few animals had been caught and tamed, self-control must be exercised if the fruits of this unwonted toil were to lay the foundations of an enlarged scheme of production in the future.

Granting the importance of the early pastoral and agricultural experiments of the human family in the beginnings of capital formation, it is often asserted that the vast accumulations of capital-goods which have characterized the modern epoch (since the coming of power machinery) have occurred outside of agriculture. As a matter of fact, a considerable part of the whole process of creating agricultural

products has been removed from the country and industrialized in town. In strict logic the fertilizer plant, the implement factory, and the stock-feed mill are functioning as capital-goods for the farmer, though their ownership is vested in other hands. Likewise, the grain fleet and the granger railway equip agriculture with capital-goods no different in point of service from the farmer's team and wagon which haul his wheat to the elevator. Naturally, since these specialized industries auxiliary to agriculture have left the farm and grown up in the city, we do not try to merge their capital-account with that of agriculture. But it is well to note that the farmer is the beneficiary of whatever added power has come to these collaborating industries through their accumulations of capital-goods.

Looking, then, at the rôle of capital-goods employed directly in the processes of agriculture, it is evident that there are some peculiarities which distinguish this industry from others. Agriculture is, in the nature of the case, an out-of-doors process. As a result, buildings are bound to remain a less important item in the productive equipment of the farm enterprise than is the case in factory employments. This does not mean, however, that the farmer can afford to neglect this factor of his productive plant. No matter how skilful a breeder or feeder one is, his labor will produce but a sorry product if he is not equipped with proper housing for his stock. The labor that raises big yields of grain or cotton or fruit will net but a fraction of its possible productivity if, for lack of storage facilities, the grain gets moldy, the cotton stained, and the apples frosted, or if crops must be dumped on the market regardless of consumers' demands. There are many regions in which building investments might be expanded, to the great increase in efficiency of farm operation. Today machinery rusts out for lack of shelter, and the efficiency of the laborer himself is sometimes lowered by the lack of proper housing (see selection 30). A recent study of tenancy in the South indicates that an important factor in the low efficiency of tenant farmers in Texas is to be found in the inadequate buildings for sheltering machinery and stock and for housing the tenant family.[1]

As for devices for catching and harnessing the powers of nature, mechanical pursuits seemed long to have the best of agriculture, since water and steam power were well adapted to their uses and little suited to the needs of the small and scattered operations incident to agriculture. Horse-power has worked wonders for agriculture since

[1] *Bulletin of the University of Texas*, 1915, No. 39.

the middle of the nineteenth century; the portable gas engine goes still farther in his aid; and water-power promises much for the future by supplying cheap electric current. Besides the utilization of small water-power sites upon the farm, we may look to see the pouring of considerable funds into the development of large hydro-electric plants. These will be interested in the sale of current to the farmer not less than to the trolley line which passes his farm. Similar developments by outside capital have already taken place in the building of great irrigation and drainage works. Such enterprises fall distinctly in Böhm-Bawerk's third class of capital services: instead of doing better or more cheaply a task already done in some other way, they make possible the achieving of a result which could not be secured at all without the intervention of such powerful capital-goods.

Most significant and promising, however, of all the efforts which agriculture is making today to equip itself with more productive capital-goods, are those which aim to furnish better instruments for utilizing the great biological forces upon which the farmer most intimately depends. Science is rapidly finding out how to concentrate the productive power of ten inferior cattle or swine or poultry into one super-animal. The extraordinary sire is capitalized at thousands of dollars simply because of his prepotency to add that superior productivity to a numerous progeny. Much money goes into plant-breeding work simply because the seeds or buds or scions so secured have a magnified power to use sunshine, plant food, and human care for the producing of consumers' goods in the future.

This last class of goods serves very well to illustrate the evanescent character of capital. It must be embodied in appropriate capital-goods in order to be productive at all, but so embodied it is subject to countless dangers of waste and ultimate dissipation. The highly bred animal is more of a liability than an asset to the unskilful farmer. It requires careful feeding and special care, or a high-priced death results instead of enlarged production. Likewise, breeding must be maintained or improved, else the strain "runs out." Every farmer knows that the value of a team may be quickly impaired by improper handling, and has seen expensive machinery spoiled by careless use.

But no less real is the waste of capital due to ill-advised purchases. Selection 91 shows how state authority is doing much to eliminate actual fraud or misrepresentation. But a given article, without having any fault of structure or composition, may be technically unsuited to the purpose in mind or its purchase not economically justifiable

in the given time and circumstance. The "lightning rod agent" may be taken as the archetype of a numerous brotherhood whose aid in directing the farmer's capital outlays has kept those expenditures from effecting the greatest increase in the productivity of his farm. "Agents sell to all who will buy and the result is that thousands of dollars are invested in worthless goods that soon find a resting place in the scrap-heap, and the poor farmer and his family struggle harder than before, for often the money to buy this needed help has been borrowed, which makes another weight to an already heavy burden." Undoubtedly rural communities have often been exploited in such ways. A mechanical engineer of my acquaintance asserts that most of the farm machinery offered in the market is, in point of design and materials, far below the standard common in machinery offered to industrial users. So many of these latter make their purchases only upon the advice of a competent engineer that manufacturers find it necessary to keep their goods always up to a standard which will pass expert examination. Farmers have seldom been competent to judge accurately the machines which they were buying, and the individual farmer buys in too small quantities to make it feasible for him to hire an expert adviser or secure laboratory tests of materials. Several of our agricultural colleges have set up testing plants and offer courses in "agricultural engineering" or similar subjects.[1]

But to no small extent this becomes a question of the organization of our agricultural industry. Not only is the individual farm too small for efficient buying of machinery and materials, but its size as an operating unit is generally not such as to secure the greatest technical efficiency of machine equipment. The steam or gasoline thrashing outfit, milking machines, water and light systems, silo-fillers, and hay presses are fair examples in point, and even the corn binder, spraying outfit, manure spreader, and almost countless others might be cited in particular cases. Either the farm must have a ruinously large stock of tools and machinery, be subject to the vicissitudes of custom work, or employ cruder methods in the face of competition by more efficient appliances. Specialization, co-operation, and con-

[1] "Professor J. Lee Hewitt was called to Bentonville last week to test a new device for mixing lime sulphur, which is used in spraying fruit trees. In speaking of the incident Professor Hewitt said in substance: 'A few years ago the people of the county would have tried out the machine with good or bad results without a thought of calling upon the Experiment Station for advice or an estimation of the mixer's value.'"—*University of Arkansas Weekly*, January 13, 1916.

solidation are three types of solution which have presented themselves. But we still wrestle with the problem.

This brings us back to our earlier proposition, viz., that the prime source of capital must be found in the surplus productivity of the enterprise. That farmer will succeed and that type of agriculture prosper which effect the greatest economy in the use of capital, which means the most judicious investment of funds and the most careful conservation of capital-goods. This problem of organization will reappear in chapters vi and vii.

A. The Significance of Capitalistic Methods[1]

80. THE ECONOMIC CONCEPT OF CAPITAL

By CHARLES GIDE

Numerous authors have invented stories of the *Robinson Crusoe* type, with a view to showing us how man originally grappled unaided with the difficulties of existence. But not one of these authors has failed to provide his hero with a few tools or provisions, usually saved from a shipwreck. These writers knew perfectly well that unless they did this the story would have to stop at the second page, for the life of their hero could not have lasted longer. The same state of things prevails in actual everyday society, convincing us of the utility of capital. There is no problem more difficult to solve than how to acquire something when one possesses nothing. Take a common laborer, a man without means. How can he earn his bread? He cannot engage in any productive enterprise, not even that of a poacher, for a poacher needs a gun. He cannot even become a burglar without implements. He would be as wretched, as helpless, and as sure to die of starvation as a Crusoe who had saved nothing from the wreck, were it not for the wage-system that enables him to enter the service of someone provided with capital who is willing under certain conditions to furnish him with the food and the tools that are requisite for production.

The first pointed stone that was picked up served to help make other new implements under conditions more favorable to production; and these in turn helped to prepare the way for still more discoveries. The ease of production increases like a geometrical progression and is proportionate to the amount of wealth already produced.

[1] Adapted from *Principles of Political Economy*, pp. 116–29. (Copyright by D. C. Heath & Co. Used by permission of the publishers.)

The socialists insist that capital is *all wealth which serves to provide its possessor with an income independent of his labor.* We must acknowledge that this definition harmonizes better with the general idea of capital, i.e., that which furnishes an income, but it evidently presupposes a specific economic and social organization, especially the fact that wealth may be loaned at interest or may be employed to give work to people who are glad to hire themselves out for wages. This particular social organization is of quite recent origin. The ruin of small industry and small farming, the expropriation of the masses, and the creation of a permanent class of wage-workers—all these things had to be accomplished before capital acquired the power to command the labor of others and to provide its owner with an income not due to any work of his own, unless we regard as work the task of watching over one's possessions and collecting profits. Socialists ridicule what might be called the *naturalistic* concept of capital, and substitute for it the *historical* concept, which regards capital, not as a permanent or necessary institution, but as the result of history.

Now there is no necessary contradiction between these two theories, since the one regards capital in its natural, permanent, sociological characteristics, while the other considers its acquired, relative, historical nature. Both may be true, and, in fact, each of them contains part of the truth. It is certain that the part played by capital has been modified by economic evolution. First it was the simple tool of the manual laborer; later it gradually passed out of his possession and came into that of the wealthy members of society. Whereas it was at first simply an instrument of production it is now often made an instrument of money-making and the means of obtaining an income without working. This new state of society is what the socialists call "capitalism." But although it may be admitted that "capitalism" will some day disappear, capital will still remain.

The definition given by the classical economists is therefore better, precisely because it emphasizes those features of capital that are essentially necessary, while the other definition points out only its accidental and ephemeral characteristics. The fact that no wealth can be produced without the help of pre-existing wealth is an economic law whose importance cannot be exaggerated. It is necessary to give a name to this pre-existing wealth, the function of which is so important and so well defined. We shall call it "capital."

Any object having value may become capital, provided certain conditions are fulfilled. The idea of capital does not connote a certain *class* or *kind* of goods, but a certain *condition* or *purpose* of goods.

The feature, condition, or purpose that makes wealth capital is *its productive use in conjunction with labor.* The part played by capital in production has given rise to unfortunate misconceptions. It is customary to say that capital yields an income. This seems to be an essential part of its nature, just as trees naturally bear fruit or as hens naturally lay eggs. Hence the income provided by capital is regarded as a product due exclusively to capital. The spread of this false notion is due partly to the fact that a vast amount of capital is in the form of securities, bonds, or shares, with interest falling due every year or every six months.

We must nevertheless abandon the idea of the natural productivity of capital—an idea which has aroused the more or less justifiable ire of the socialists. The mysterious productive and generative power, attributed to capital as part of its nature, is a pure chimera. Notwithstanding the popular belief to the contrary, money does not produce money nor does capital produce capital. Not only has a bag of money never produced a single cent, as Aristotle remarked long ago, but a bale of cotton or a ton of iron never has produced any cotton or iron. Capital is inert matter, and by itself is absolutely sterile. But when it is put in the service of labor, it gives labor a degree of productivity that may be very great. With a horse and plow, a farmer can produce more wheat than with his manual labor alone. It is this increased or supplementary crop that constitutes the income from capital. It does not arise from the plow; it is due to the man aided by the plow.

Capital which can be used only once, because it is consumed in the act of production, is called *circulating capital;* examples of this kind of capital are: the wheat that is sown, manure that is mixed with the soil, coal that is burned, cotton that is spun. Capital that can be used to serve for several productive acts is called *fixed capital;* it may include the most fragile implements, such as needles, and the most durable kinds of wealth, such as canals or tunnels, which last as long as the world.

81. MACHINERY AS A MEANS OF INCREASING THE EFFECTIVENESS OF LABOR[1]

Barley (unit 3), oats (unit 13), rice (unit 17), rye (unit 18), and wheat (units 26 and 27) may be grouped under the head "small grains" and considered together as to a number of operations. In

[1] Adapted from the *Thirteenth Annual Report of the Commissioner of Labor* 1898, pp. 84–87.

seeding, a sack was the tool or implement used in all these units under the earlier method, the seed being sown broadcast and covered by the use of a brush, drag, or harrow. The time for sowing the seed was quite uniform, being, under the primitive method, 1 hour and 25 minutes in units 3, 13, and 27; 1 hour and 22.5 minutes in unit 17; 1 hour and 15 minutes in unit 26, and 1 hour in unit 18. Under the modern method a broadcast seeder was used in units 13 and 26, the sowing being done in 20 minutes and 15 minutes, respectively, or in about one-fourth and one-fifth of the time required by hand, as just shown. The subsequent harrowing to cover the seed occupied 50 minutes and 12 minutes, respectively, in these units as against 2 hours and 50 minutes and 2 hours and 30 minutes under the earlier method. In unit 17 the seed was sown and covered at one operation in 55 minutes as against a total of 3 hours and 12.5 minutes required for the work done in two operations under the more primitive method. The same conditions were found in unit 18 as in unit 17, the time being 1 hour under the modern and 2 hours and 40 minutes under the primitive method. The greatest advance in these units is to be seen in those numbered 3 and 27, where, under the machine method, a combined gang plow, seeder, and harrow broke the ground, sowed and covered the seed, and pulverized the topsoil at one operation. This was accomplished in unit 3 in 10.9 minutes, the power being a traction engine requiring the attention of two men, making the aggregate time 21.8 minutes. In unit 27 the same work was done in 15 minutes, the aggregate time for the engineer and fireman necessary to run the machine being 30 minutes. Strictly speaking, the time of the water-hauler should be added, as he was necessary for the operation of the machines used. Adding this time and comparing it with total time required for the operations done separately by the primitive method, the time was 32.7 minutes under the modern as against 10 hours and 55 minutes under the primitive method in unit 3, and 45 minutes as against 10 hours and 55 minutes in unit 27, a reduction to about one-twentieth and one-fifteenth the time required under the hand method in the respective units. This great saving is accounted for by the fact that the implement used under the modern method was a six-gang plow, each gang having 4 plows, each plow cutting 10 inches—total 240 inches—with a seeder and harrow attached to each gang, and all operated by a traction engine. This would seem to mark the limit of progress in this direction, and such machinery is obviously of profitable use only in a level country where farming is conducted on a large scale.

The operation of harvesting was uniformly accomplished by the use of a sickle under the earlier method, the cutting and binding being done by hand. Comparisons cannot be made in all of the units, as the operations vary so much under the modern method. Three units show the use of self-binders and three the use of the combined reapers and thrashers which do away with the operations of binding and shocking the grain. In unit 13 the use of the self-binder reduced the time for cutting, binding, and shocking under the modern method to 2 hours as against 16 hours and 40 minutes under the primitive, these operations under the primitive method requiring more than eight times as long as under the modern. In unit 17 the saving was still greater, the cutting and binding being done in 55 minutes under the modern as against 33 hours, or thirty-six times as long, under the primitive method by the use of sickles, no shocking being reported. The grain was shocked in unit 18, but the operation is kept separate, so that a comparison can be made as to the different operations. The cutting and binding required 1 hour with the self-binder, and 11 hours and 33.8 minutes with sickles, while the shocking required two hours under each method. The more complex machines reported in units 3, 26, and 27 were propelled by steam in units 3 and 27, and by 26 horses in unit 26. Here the grain was reaped, thrashed, and sacked in one continuous operation. In unit 3 the operations necessary to do this work under the earlier method required 48 hours and 40 minutes, while under the later method the time required by the machine was 7.5 minutes, 7 men being employed, making the total time 52.5 minutes; including the time of the two water-haulers, for the same reason as noted in discussing the combined plow and seeder, the total time under the machine method was 1 hour and 7.5 minutes, or about one forty-third the time required when sickles and flails were used. In unit 27 the totals are 49 hours and 20 minutes under the earlier method and 1 hour and 21 minutes under the later. The totals in unit 26 show the best proportionate results from the use of the combined reaper and thrasher, being 46 hours and 40 minutes under the earlier and 1 hour under the later method. The time for binding and shocking grain and stacking straw is included in the time for the hand methods given above (units 3, 26, and 27), which operations were not necessary under the machine method.

Thrashing is reported as a separate operation in units 13, 17, and 18. In units 13 and 18 the work was done under the earlier method entirely by hand, the flail, pitchfork, shovel, and winnowing

sheet being the tools used, while in unit 17 a horse-power thrasher was used in 1870. This thrasher took 13 hours and 17.5 minutes to do the work done by the steam thrasher in 2 hours and 37.5 minutes. In unit 13, under the hand method, the thrashing required 41 hours and 5 minutes as against 1 hour and 16.8 minutes, the time required by the use of the modern thrasher (including the time charged to hauling water)—a ratio of more than 32 to 1 in favor of the machine. In unit 18, the time required under the earlier and later methods, respectively, was 26 hours and 45.1 minutes and 7 hours. This disproportionately long time required (7 hours) is explained in part by the fact that the length of the rye straw made the work much slower than with other grains, and in part by the fact that the rye being thrashed from the barn mow, more men were necessary than if it had been thrashed from wagons. The actual running time of the thrasher in this case was 30 minutes.

This group presents a comparison of extremes, the appliances being entirely changed throughout in some of the units, showing a more complete supplanting of hand by machine labor than can be found, perhaps, in any other line of agriculture. These changes have taken place in the past sixty-five years, as indicated by the dates given by these units, though in fact most of them have occurred in a much shorter period. In units 3 and 27 the number of operations is practically reduced to two, and it is in these units that the greatest aggregate saving was effected, the total time in unit 3 being 63 hours and 35 minutes under the earlier and 2 hours and 42.8 minutes under the later method—a ratio of more than 23 to 1 in favor of the modern method; while in unit 27 the respective totals are 64 hours and 15 minutes and 2 hours and 58.2 minutes—a ratio of nearly 22 to 1. These results are the best shown in this industry.

82. THE RELATION OF FARM CAPITAL TO LABOR INCOME[1]

By E. H. THOMSON and H. M. DIXON

In the course of a farm-management survey of three representative areas in Indiana, Illinois, and Iowa, records were secured from 247 tenant farmers. These men made an average labor income of $870 from an investment of less than $2,500. When it is remembered that the farm-owners with over 12 times this investment made less than half the labor income of the tenants, the evidence is unmistakable that

[1] Adapted from *Bulletin 41, United States Department of Agriculture*, pp. 11–13.

the man with small capital should rent rather than buy a farm. For the amount invested, the tenant's income is much greater than that of the farm-owner. The sum available for the family living, however, is much smaller in the case of the tenant, for the farm-owner, with an average capital of $30,606, has $1,530 interest to use, as well as the $408 labor income. Thus, if the farm-owner is free of debt, as one-half of them are, he has $1,938 available for a living, as compared with the tenant's $992.

Turning to farms operated by owners, we find that the relation of capital to labor income on 273 such farms was as follows:

Capital	Number of Farms	Average Labor Income	Capital	Number of Farms	Average Labor Income
$ 5,000 and less..	9	$ 74	$40,001–$60,000..	29	$ 315
5,001–$10,000..	37	45	60,001– 80,000..	10	1,114
10,001– 15,000..	44	283	80,001 and over.	12	1,804
15,001– 20,000..	45	265			
20,001– 30,000..	55	264	Average.....		$ 408
30,001– 40,000..	32	483			

The chance of a farm-owner making a labor income of $1,000 with less than $15,000 invested is less than 1 in 20. It may be also noted that the farm-owners showing the greatest losses (*minus* labor income of $500 or more) had nearly as much capital invested as did those securing labor incomes of $2,001 and over. This shows clearly the penalties that follow an injudicious or unfortunate outlay of capital.

As to the relation of tenants' capital to their labor incomes, it is interesting to observe that farmers having less than $1,000 of capital secured very small labor incomes ($324 and $799 for the two groups), whereas farmers better equipped with capital were able to secure labor incomes of from nearly $1,000 to nearly $3,000. However, the increase in labor income is less than proportionate to increase in capital after the $1,501 to $2,000 group is passed. This goes to show that for efficient use of capital-goods in the corn belt a rather expansive type of farming is needed. Farms with less than 100 acres in crops are not utilizing horse labor nearly as efficiently as the larger places.

NOTE.—Figures of a similar nature are given by Warren and Livermore in *Bulletin 295* of the Cornell Experiment Station. All these data are open to the objection, for our present purpose, that in

the case of farm-owners capital is made to include real estate. The Cornell tables follow.—EDITOR.

TABLE IX

RELATION OF CAPITAL TO PROFITS. 615 FARMS OPERATED BY OWNERS

Capital	Number of Farmers	Percentage of the Farmers Making Labor Incomes of Less than $401	Percentage of the Farmers Making Labor Incomes of over $1,000	Average Labor Income
$ 2,000 or less.....	36	81	0	$ 192
2,001–$ 4,000...	200	75	0	240
4,001– 6,000...	183	59	8	399
6,001– 8,000...	94	40	14	530
8,001– 10,000...	45	38	22	639
10,001– 15,000...	44	30	32	870
Over 15,000 ...	13	31	46	1,164

TABLE X

RELATION OF TENANTS' CAPITAL TO PROFITS. 134 FARMS

Tenants' Capital	Number of Farms	Average Labor Income
$ 500 or less.....	12	$282
501–$1,000.....	45	309
1,001– 1,500.....	43	342
1,501– 2,000.....	15	356
2,001– 3,000.....	16	670
Over 3,000.....	3	880

B. The Increase in Capital Employed in American Agriculture

83. CONCERNING THE INCREASED USE OF POWER MACHINERY ON THE FARM[1]

The year 1850 practically marks the close of the period in which the only farm implements and machinery, other than the wagon, cart, and cotton gin, were those which, for want of a better designation, may be called implements of hand production. The old cast-iron plows were in general use. Grass was mowed with the scythe, and grain was cut with the sickle or cradle and thrashed with the

[1] Adapted from Twelfth Census of the United States, Vol. V, pp. xxix–xxxi.

flail. The last half-century has witnessed a revolution in agricultural methods, and the new implements and the machines introduced would require more than a page to catalogue.

Tables XII and XIV present figures showing the increase in the value of farm machinery in the various sections from 1850 to 1900.

TABLE XII

VALUE OF FARM IMPLEMENTS AND MACHINERY IN THE UNITED STATES, WITH INCREASE AND PERCENTAGE OF INCREASE BY DECADES: SUMMARY 1850 TO 1900

Census Year	Value of Farm Implements and Machinery	Increase by Decade	Percentage of Increase
1900	$761,261,550	$267,014,083	54.0
1890	494,247,467	87,727,412	21.6
1880	406,520,055	135,606,377	50.1
1870	270,913,678	24,795,537	10.1
1860	246,118,141	94,530,503	62.4
1850	151,587,638		

TABLE XIV

AVERAGE VALUE OF IMPLEMENTS AND MACHINERY PER ACRE OF FARM LAND, BY GEOGRAPHIC DIVISIONS: SUMMARY 1850 TO 1900

Geographic Divisions	1900	1890	1880	1870	1860	1850
The United States	$0.90	$0.79	$0.76	$0.66	$0.60	$0.52
North Atlantic	2.34	1.86	1.58	1.43	1.21	0.98
South Atlantic	0.51	0.36	0.30	0.22	0.32	0.26
North Central	1.15	0.98	1.00	0.89	0.67	0.57
South Central	0.49	0.37	0.35	0.30	0.52	0.47
Western	0.56	0.64	0.60	0.48	0.33	0.10

The values of farming implements on hand at the date of census enumeration increase in each decade since 1850 in the North Atlantic, North Central, and Western divisions, while in the South Atlantic and South Central states they show a decline of $14,020,511 and $31,435,478, respectively, in the decade 1860 to 1870, reflecting the disastrous effect of the Civil War. After 1870 the values increased in both these divisions, but not until 1890 did the aggregate of such gain suffice to give the South Atlantic division as large a reported value of this class of farm property as it had in 1860; and in the South Central states, notwithstanding the great growth of population, the

farmers did not, until 1900, report as large investments in machinery as they did prior to the war.

For the United States the value of machinery per acre of farm land has increased since 1850 from $0.52 to $0.90, or nearly 80 per cent, and since 1880 from $0.76 to $0.90, or about 20 per cent. These increases in money value, however, do not measure the added usefulness of the new machinery. That is measured principally by the degree to which the machinery saves human labor by substituting the power of animals or of steam. It is interesting, therefore, to inquire what changes have been made in the past fifty years in the use of animal power on farms in connection with these new machines. A comparison of human and animal labor on farms in relation to the acreage of crops cultivated can be made only for the period since 1880. Table XV makes a comparison between the number of males engaged in agriculture, the number of draft animals on farms, and the acreage of all crops reported at the last three census dates.

TABLE XV

NUMBER OF MALES IN AGRICULTURE, NUMBER OF HORSES, MULES, AND ASSES ON FARMS, AND AREA OF LAND DEVOTED TO SPECIFIED CROPS, WITH AVERAGES: SUMMARY 1880 TO 1900

Items	1900	1890	1880
Number of males in agriculture	8,771,181	7,787,539	7,075,983
Number of horses, mules, and asses	20,099,826	17,264,999	12,170,296
Acres of land and specified crops	272,304,111	214,523,412	164,830,442
Average number of acres to one male worker	31.0	27.5	23.3
Average number of acres to one horse, etc	13.5	12.4	13.5
Average number of horses to one male worker	2.3	2.2	1.7

The number of acres of leading crops per male worker steadily increased, while the number per working animal was substantially the same in 1900 as in 1880. The increase in productiveness of man's labor, therefore, is secured by the increased utilization of the power of the horse and the mule in driving farm machinery. The figures of the table indicate two important changes in the twenty years. One of these appears in the increase in the number of horses to each male worker from 1.7 to 2.3, a gain of about 35 per cent; the other is the increase in the number of acres cultivated to each male worker from

23.3 to 31.0, or about 34 per cent. From these figures it appears that in the last twenty years, by the aid of machinery, and the substitution of horse power for hand labor, the effectiveness of human labor on farms has been increased to the extent of about 33 per cent.

84. FARM BUILDINGS, FARM MACHINERY, AND LIVE STOCK—1900 TO 1910[1]

Table VII shows, by geographic divisions and sections, the value of farm property of various classes, together with the amounts and percentages of change between 1900 and 1910.

TABLE VII

Division or Section	Value of Buildings		
	1910	1900	Increase Percentage
United States	$6,325,451,528	$3,556,639,496	77.8
New England	336,410,384	244,806,945	37.4
Middle Atlantic	980,628,098	729,069,850	34.5
East North Central	1,642,292,480	939,573,660	74.8
West North Central	1,562,104,957	758,405,725	106.0
South Atlantic	603,086,799	306,528,682	96.7
East South Central	411,570,975	225,627,372	82.4
West South Central	412,498,352	185,105,506	122.8
Mountain	145,026,777	54,554,862	165.8
Pacific	231,832,706	112,966,894	105.2

Division or Section	Value of Implements and Machinery		
	1910	1900	Increase Percentage
United States	$1,265,149,783	$749,775,970	68.7
New England	50,798,826	36,551,820	39.0
Middle Atlantic	167,480,384	116,253,270	44.1
East North Central	268,806,550	166,694,220	61.3
West North Central	368,935,544	197,367,840	86.9
South Atlantic	98,230,147	53,318,890	84.2
East South Central	75,339,333	48,767,235	54.5
West South Central	119,720,377	77,925,050	53.6
Mountain	49,429,975	18,807,620	162.8
Pacific	66,408,647	34,090,025	94.8

[1] Thirteenth Census of the United States, Vol. V, pp. 41–47.

TABLE VII—*Continued*

Division or Section	Value of Live Stock		
	1910	1900	Increase Percentage
United States	$4,925,173,610	$3,075,477,703	60.1
New England	97,896,823	74,826,332	30.8
Middle Atlantic	349,159,535	245,635,518	42.1
East North Central	976,329,922	604,633,707	61.5
West North Central	1,551,708,097	972,343,643	59.6
South Atlantic	366,534,152	194,362,808	88.6
East South Central	369,034,607	213,320,732	73.0
West South Central	589,837,078	403,138,495	46.3
Mountain	388,746,520	243,836,888	59.4
Pacific	235,926,876	123,379,580	91.2

More significant than comparisons between states, divisions, and sections, with respect to the total value of farm property, are comparisons of the average value of farm property per acre of land in farms. In making such comparisons, however, it should be borne in mind that they are made on the basis of all land in farms and not of improved land in farms, so that those sections and states in which improved land constitutes the greater proportion of all land in farms will for the most part show the greatest value per acre of land in farms. Table VIII shows, for each geographic division and section, the average value of farm property of these three classes per acre of land in farms, together with amounts and percentages of change between 1900 and 1910.

The several divisions differ much more widely in average value of buildings per acre of land in farms than in average value of land alone per acre, the amounts for the former item ranging in 1910 from $2.44 in the West South Central and Mountain to $22.70 in the Middle Atlantic division. The three northeastern divisions, the New England, Middle Atlantic, and East North Central, reported a much higher value of buildings per acre of farm land than any of the others. There is also a wide diversity in the average value of implements and machinery per acre of land in farms; it ranged in 1910 from $0.71 in the West South Central division to $3.88 in the Middle Atlantic. Here, again, the three northeastern divisions ranked very much higher than the others, because of the high percentage of farm land improved and the more advanced and intensive methods used in the cultivation of the land, requiring a larger relative outlay for modern

TABLE VIII

Division or Section	Average Value of Farm Property per Acre of Land in Farms											
	Buildings				Inmplements and Machinery				Live Stock			
	1910	1900	Increase		1910	1900	Increase		1910	1900	Increase	
			Amount	Percentage			Amount	Percentage			Amount	Percentage
United States	$ 7.20	$ 4.24	$2.96	69.8	$1.44	$0.89	$0.55	61.8	$5.60	$3.67	$1.93	52.6
New England	17.06	11.91	5.15	43.2	2.58	1.78	0.80	44.9	4.97	3.64	1.33	36.5
Middle Atlantic	22.70	16.25	6.45	39.7	3.88	2.59	1.29	49.8	8.08	5.48	2.60	47.4
East North Central	13.93	8.08	5.85	72.4	2.28	1.43	0.85	59.4	8.28	5.20	3.08	59.2
West North Central	6.71	3.77	2.94	78.0	1.59	0.98	0.61	62.2	6.67	4.84	1.83	37.8
South Atlantic	5.81	2.94	2.87	97.6	0.95	0.51	0.44	86.3	3.53	1.86	1.67	89.8
East South Central	5.05	2.78	2.27	81.7	0.92	0.60	0.32	53.3	4.53	2.63	1.90	72.2
West South Central	2.44	1.05	1.39	132.4	0.71	0.44	0.27	61.4	3.49	2.28	1.21	53.1
Mountain	2.44	1.18	1.26	106.8	0.83	0.41	0.42	102.4	6.53	5.26	1.27	24.1
Pacific	4.52	2.38	2.14	89.9	1.29	0.72	0.57	79.2	4.60	2.60	2.00	76.9

machinery. In the South, where cotton, for which harvesting machinery is not required, is the principal crop, the average value of implements and machinery per acre of land is naturally low. Much less difference appears among the several divisions with respect to the average value of live stock per acre, the maximum being $8.28 for the East North Central division and the minimum $3.49 for the West South Central.

In considering the increases reported in the average value of the various classes of farm property, per acre of land in farms, it should be borne in mind that in the Southwest and West a large acreage of land reported as farms in 1900 was not so reported in 1910, although there was not necessarily any actual or at least any material change in the extent to which such land was in fact used for agricultural purposes. This change tends to exaggerate the increase in average values per acre.

The highest rates of increase in the average value of buildings per acre were in the West South Central division, 132.4 per cent; the Mountain, 106.8 per cent; the South Atlantic, 97.6 per cent; and the Pacific, 89.9 per cent. In every state the average value of buildings per acre of land in farms was higher in 1910 than in 1900; in Arizona and Oklahoma it was more than three times as great; and in 16 other states it was more than double. The country as a whole shows an increase between 1900 and 1910 of 52.6 per cent in the average value of live stock per acre of land in farms. The highest percentage of gain was in the South Atlantic division, 89.8 per cent, while the lowest was in the Mountain division, 24.1 per cent. Among the states the highest rate of increase, 160.3 per cent, was shown in Arizona; and in three other states, Georgia and the two Carolinas, the value more than doubled during the decade. The only states showing a decline were New Mexico (37.5 per cent) and Colorado (1.7 per cent). The actual value of the live stock in both these states was much greater in 1910 than in 1900, but the acreage of farm land increased in still greater ratio.

The average value of implements and machinery per acre of all land in farms has been given. The use of implements and machinery, however, is largely confined to improved farm land and more particularly to that portion occupied by crops. The average value of implements and machinery per acre of *improved* land in farms in 1910 was much higher in the New England and Middle Atlantic divisions than in any other and was lowest in the East South Central division. The average value based on *land in crops* was also highest in the two

northeastern divisions, followed by the Pacific and Mountain divisions, and was again lowest in the East South Central division. Disregarding the District of Columbia, the highest average value of implements and machinery per acre of improved land in farms appeared in the states of Rhode Island and Massachusetts; outside of the New England and Middle Atlantic divisions the highest averages were in Arizona, Delaware, and Wisconsin, the high average in Arizona being doubtless attributable to the importance of the cultivation of irrigated lands. Between 1900 and 1910 the average value of implements and machinery per acre of improved farm land more than doubled in Louisiana and South Carolina, while the average value of land in crops more than doubled in Louisiana and California, and exactly doubled in South Dakota. The lowest rate of increase in the value of implements and machinery per acre of land in crops was in New Mexico, and the same state showed the only decrease (20.2 per cent) in their value per acre of improved land.

85. A CONCRETE CASE[1]

Mr. J. M. Ward, of Limestone, Maine, enumerates the necessary machinery for potato growing as follows:

2 sulky plows	$100
2 spring-tooth harrows	25
1 planter	65
1 two-row riding cultivator	45
1 horse hoe for hilling	10
1 four-row sprayer	65
1 digger	100
Total	$410

This equipment, with the addition of one wagon of the type known as a jigger, is operated by two men and four heavy horses. The two men with this equipment are able to prepare for, plant, and handle 50 acres of potatoes up to digging time, when they require six or seven day hands to pick up the potatoes. This, of course, is an expensive equipment compared with that formerly used on the potato crop, which was as follows:

1 walking plow	$15
1 harrow	15
1 horse hoe	10
Hand hoes	3
Total	$43

[1] *Farmer's Bulletin 365*, p. 13.

Without question the additional outlay increases the acreage which two men can handle just about in proportion to the increase in cost.

C. Giving Capital Outlays Their Greatest Effectiveness

86. THE EFFICIENCY OF CAPITAL-GOODS AS RELATED TO SIZE OF FARM[1]

By G. F. WARREN

Three or four horses are the smallest number that can be used efficiently with modern machinery. A survey of 586 farms in Tompkins County, New York, shows those of 151 to 200 acres to be the smallest ones that have an average of four horses per farm. The farms of less than 30 acres average 1.4 horses per farm. The figures of acres per horse are still more striking. The small farms have not enough horses to make efficient teams and yet they are oversupplied with horses compared with their area. On these farms there are only 15 acres per horse. On the largest farms, one horse farms three times this area, with no resulting decrease in crop yields. When we consider the cost of keeping a horse we see what a great advantage the larger farmers have.

According to the United States Census (Twelfth), the area farmed per man has increased one-third in the past twenty years. This increase has been due to the use of more horses per team, increasing the acreage that he could farm in the same ratio. At the same time the crop yields of the country have increased. The most striking examples of the use of four- to six-horse teams are in the Middle West. In some cases, as in Iowa, this has resulted in a decrease in rural population. At the same time total production has increased. One man is often farming as much land as two men farmed a few years ago and doing it better.

The figures showing relative efficiency of horses are as given in Table XXXIII.

The case as to farm machinery is similar. The value of farm machinery is only $341 for farms of 61–100 acres. These valuations are probably not over half of what new machinery would cost. Anyone who has ever made a list of the necessary farm machinery will see at once how inadequately these small farms are equipped. Yet their machinery cost nearly twice as much per acre as that on the larger

[1] Adapted from *Bulletin 295, Cornell Experiment Station*, pp. 419–21.

farms that have nearly three times as much machinery. Machinery can be used more effectively on large farms. One mower, one hay rake, one tedder, one hay loader, one corn harvester, one grain harvester, one grain drill, one manure spreader, one potato digger, one

TABLE XXXIII

SIZE OF FARM RELATED TO HORSES. 586 FARMS OPERATED BY OWNERS

Acres	Average Size (Acres)	Average Number of Horses	Acres per Horse
30 or less	21	1.4	15
31– 60	49	2.3	21
61–100	83	2.8	30
101–150	124	3.4	37
151–200	177	4.3	41
Over 200	261	5.3	49
Average	103	3.1	33

potato planter, can do their work on a 250-acre farm as readily as on a small farm. Few of the small farms have half of these tools. If a small farm does have nearly all the list, it cannot use them enough to pay for the investment. The more efficient and numerous machines become, the larger our farms should be. It is interesting to note how many of the tools are of very recent development. Almost half the value of farm machinery on a well-equipped farm is invested in machinery that has been perfected in the last few years.

In each of the groups the farmer's labor income is almost the same as the value of his machinery.

TABLE XXXIV

SIZE OF FARM RELATED TO MACHINERY AND TOOLS 586 FARMS OPERATED BY OWNER

Acres	Average Size (Acres)	Value of Machinery and Tools	Acres Farmed with $100 Worth of Machinery and Tools
30 or less	21	$125	17
31– 60	49	243	20
61–100	83	341	24
101–150	124	495	25
151–200	177	592	30
Over 200	261	914	29
Average	103	$407	25

The[1] small farm has relatively more of its capital invested in unproductive ways than does the large farm. No matter how small the farm may be, the owner desires a respectable house. Table XII shows that the smallest farms have 43 per cent of their capital in houses; the largest farms have somewhat better houses, but have only 9 per cent of their capital thus invested.

TABLE XII

AREA RELATED TO INVESTMENT IN BUILDINGS. 578 FARMS, LIVINGSTON COUNTY, NEW YORK

Acres	Value of Houses	Percentage of Total Capital in Houses	Value of Other Buildings	Percentage of Total Capital in Other Buildings	Value of Other Buildings per Animal Unit
30 or less	$1,494	43	$ 655	19	$164
31– 50	1,000	23	681	15	95
51–100	1,236	18	1,091	16	87
101–150	1,477	14	1,408	13	74
151–200	1,810	13	1,900	13	73
Over 200	2,113	9	2,552	11	50

Similarly for barns, the smallest farms have 19 per cent of their capital thus invested, whereas the largest farms have only 11 per cent thus tied up. An equally good barn for 10 head of stock cost much more than half as much as a barn for 20 head of stock. The largest farms have only an investment in barns of $50 per animal unit, yet observation leads to the conclusion that the stock on the larger places is better housed than on the smaller farms, where the expense per animal unit runs as high as $164. If interest, repairs, depreciation, and insurance on a building amount to 10 per cent of the value, then the housing cost per animal unit will vary from $16 per year on the smallest farms to $5 per year on the largest. Figures from the Thirteenth Census indicate that these conditions are general. Farms of less than 20 acres have 36 per cent of their capital invested in buildings and machinery. Those of 100 to 174 acres have only 17 per cent of the money thus invested, yet they have much better buildings and more machinery.

[1] The remaining paragraphs of this reading are from *Bulletin 341* of the same station, and are by the same author.

87. THE PROPER APPORTIONMENT OF CAPITAL OUTLAYS[1]

By L. W. ELLIS

Successful farm management presupposes a proper relation between the various factors of production. The study of farm equipment was undertaken for the purpose of determining from the study of successful farms the relationship that should exist between investments in land, improvements, live stock, machinery, and tools. The farms from which data are embodied in this report are probably above the average type in the character of the proprietors, method, and equipment, yet they are not necessarily examples of exceptionally successful management. Of the 21 farms studied, 6 include dairying as the principal enterprise, 1 is devoted largely to feeding sheep, and 2 others place greater emphasis on the feeding of cattle than the average farm, but in no instance are the equipment and management those of a highly specialized type of farm. They represent, on the whole, the most common type of farm to be found in the state.

First we will examine the present distribution of investment as shown by the inventory. The appraisement of the value of permanent improvements was extremely difficult and the values given must be accepted with due allowances. In this study the building values are a compromise between the cost of equipping the farm with similar structures, less a proper amount of depreciation, and the sale value of the buildings as suggested by comparing the values of land with and without buildings.

It can safely be said that buildings represent, not only the most expensive class of farm equipment, but the least negotiable. Leaving out household buildings, the remainder on the farms studied shows a much greater variation in investment per acre than any other class of equipment, and a greater variation in percentage of the total investment than land, water supply, live stock, or machinery. Fences, artificial drainage, and water systems may often be dispensed with wholly or to a great extent; hence they are scarcely comparable with land, buildings, live stock, and machinery as regards the relative investment.

One of the most important phases of a study of farm equipment is the determining of the relation that should exist between buildings

[1] Adapted from "A Study of Farm Equipment in Ohio," *Bulletin 212, Bureau of Plant Industry, United States Department of Agriculture*, pp. 7–53.

and the farm enterprise, in order to reduce the wide variation in investment per acre in buildings designed for the same purposes. Prior to a study of the cost and construction of buildings there should be established standard space units to be used in determining the actual building requirements of the farm for the storage of products and machinery, the housing of live stock, and the transaction of the farm affairs.

As a basis for comparing the individual farms the mean and the average of the data from 21 farms are both included. The mean is obtained by adding together the figures per acre for the 21 farms and dividing by 21, while the average is computed by taking the total investment for the 21 farms and dividing by the sum of their acreages. The mean, then, is an average having the farm as a unit, while the average regards the acre as the unit. In this study of farms the mean is regarded as the more suggestive, since it takes into account the effect of the size of the farm upon the acre investment.

The results are given in the accompanying table.

	For 21 Farms	
	Mean (Farm Unit)	Average (Acreage Unit)
Land	$45.96	$46.25
Farm buildings	10.59	9.27
Household buildings	10.16	9.11
Fences	3.39	3.22
Drainage	2.94	2.21
Water supply	1.18	1.04
Live stock	12.12	11.40
Machinery, etc	5.36	4.67
Produce, supplies, etc	3.97	3.81

An examination of the figures for individual farms will show the range of investment per acre in farm buildings to be from 67 cents on farm 24, where a very old barn and several equally old sheds, etc., constituted the building equipment, to $32.25 for farm 25, where the value of a small barn and poultry house is divided by a small acreage. The investment varies with the number and condition of buildings, but the number and cost do not vary with the acreage.

Farms 13 to 17 are similar in character and location, yet the building equipment of farm 13 is $11.35 per acre, while on Nos. 14 to 17, inclusive, the valuation does not reach $5 per acre on any farm. This is due to the fact that farm 13 is really composed of three farms

formerly separate. On the other hand, farms 3, 5, 12, 18, 19, and 28, ranging in size from 104 to 504 acres, show an investment in farm buildings of $15.78 to $26.85 per acre, while farms 7, 8, 10, and 30, varying in size from 49.61 to 100 acres, have an investment in farm buildings of but $6.33 to $12.70 per acre.

In household buildings (dwellings) there is a variation from $4.07 to $46.09 per acre. The 21 farms as a whole have practically the same investment in farm buildings ($10.59 per acre) and in household buildings ($10.16 per acre), but individual cases show wide extremes. The owner of farm 24 ($0.67 per acre for farm buildings and $5.39 for household buildings) realized his lack of the former and contemplated erecting a new barn in the near future. On the other hand, the owner of farm 30 ($6.33 per acre for farm and $31.64 for household buildings) had recently moved from the city and had put most of his ready capital into remodeling the dwelling. He admitted that this outlay had prevented him from buying certain essential farm machinery.

The acre investment in tile drainage and water supply depends largely on the natural advantages of the farm. In several cases the small size of the farm makes the acre investment in water systems large, even though the systems are not extensive. Two of the farms with high bare-land values also show highest valuation of tile drainage. Here, thorough drainage is undoubtedly a large factor in maintaining the value of the land.

With the exception of 4 farms the acre investment in machinery, wagons, harness, tools, etc., ranges within comparatively narrow limits (from $2.87 for farm 13 to $7.56 for farm 28). The four exceptions are farm 22 (acre valuation $2.22), for which much of the machinery was borrowed; farm 24 (acre valuation $1.17), for which machinery was generally bought second hand; and farms 7 and 25 (valuations $12.70 and $14.39), which are low in acreage. With the exception of farms 22, 24, 25, and 28, the total machinery investment per farm varies only about 136 per cent, as compared, for instance, to 1,275 per cent for the total value of farm buildings and 835 per cent for household buildings. Two large farms, containing 342 and 388.92 acres, respectively, show low acre investments in machinery ($3.14 and $2.87, respectively), while farm 28, the largest, containing 504 acres, ranks among the highest, showing an acre investment of $7.56 and indicating overequipment.

Turning to a critical analysis of these data, it is impossible to make a general recommendation as to equipment, owing to the complex and varying combinations of enterprises on different farms. The great variations in the tastes and circumstances of farm-owners is largely responsible for the variations in the cost of household buildings, and it is almost impossible to arrive at a satisfactory basis for determining the proper outlay in this respect. But it is possible to plan a practicable set of farm buildings which almost exactly fit the conditions of the average farm under consideration (165.88 acres). A basement barn 36 by 60 feet provides 2,160 square feet of floor space for the housing of cattle, horses, and sheep, with space for storage of hay, grain, and machinery above. Where a basement barn is not practicable a second building may be provided for the storage of hay and the shelter of a part of the live stock. Besides the grain room in the basement barn there is needed a double crib or combination of crib and granary with a driveway between, which, when inclosed by doors at either end, may be used as a convenient wagon or buggy shed. A building 20 by 28 feet and 10 feet in height, with an 8-foot gable, is suggested, and another building 22 by 30 feet and 12 feet to the eaves will be called for as a machinery shed and workshop. Finally, there may be separate hog house, poultry house, silo, potato cellar, or other miscellaneous buildings demanded by the special character of the farm.

The data indicate that 4 work horses, 2 head of young stock, and either a driving horse or brood mare, which may occasionally be worked, are about the average requirements as to horses. Six farms on which dairying is the principal enterprise kept, altogether, 95 milch cows, and on ten other farms there were 29 milch cows.

In making up a list of machinery for the average farm so many factors enter into consideration that a generalization is of little value. Of the 21 farms, all reported a walking plow, a spike-tooth harrow, a farm wagon and box, and a mower; 19 had a sulky hayrake; 18 had hayrack, grain binder, and 1-horse cultivator; 17 had 2- or 3-horse cultivators. Outside of these nearly indispensable articles, every farm had some items of equipment whose importance was due to the particular character of their crops—2 Babcock testers, 4 potato planters, 6 sap evaporators, etc.

The general distribution of outlays among land, improvements, and equipment may be summarized as follows:

Land, 165.88 acres at $46.25 (average)	$7,676.42	
Farm buildings	2,700.00	
Household buildings	2,500.00	
Fences	763.74	
Drainage	366.43	
Water supply	225.00	
		$14,231.59
Work animals	640.71	
Colts and driving horses	250.95	
Cattle	582.26	
Sheep	201.05	
Swine	158.34	
Poultry	52.60	
Bees	3.23	
Harness	131.05	
Machinery	1,125.48	
Minor articles	200.00	
Produce, supplies, etc	631.93	
		3,977.60

In actual practice innumerable factors tend to reduce the cost of equipping farms. Few farms in the older sections of the United States, like Ohio, are equipped outright with new buildings, fences, and machinery, and the foregoing summary would, of course, apply only to these farms; but the table is of interest in showing the amount of money spent during a series of years in bringing the equipment up to a profitable working basis. Proper organization, a prerequisite to successful farm management, refers not only to the cropping system, live-stock management, etc., but to the distribution of capital and the selection of equipment. This study of a number of Ohio farms does not afford sufficient data from which to draw general conclusions, but illustrates by concrete example many of the factors to be taken into consideration in equipping farms.

88. OVERINVESTMENT IN BUILDINGS AND MACHINERY[1]

By G. F. WARREN

In Livingston County, the investment in houses represents 14 per cent of the total capital in the farm business, including real estate, equipment, live stock, and supplies. Certainly, one should hesitate

[1] From "Some Suggestions for City Persons Who Desire to Farm," *Circular No. 24, Agricultural Experiment Station of the College of Agriculture, Cornell University*, pp. 35–36.

to build a new home that represents much over a fifth of the capital. The house may be said to be a personal matter, but if the investment goes much beyond this, it is too valuable a house for the farm.

The average cost of barns per cow or equivalent in other animals was $70 in Livingston County. One who spends over $100 per cow should be sure that he is right. The interest, repairs, taxes, insurance, and other costs on such a building amount to about 8 to 10 per cent. The above limit would make an annual cost of $10 per cow for barn rent. One set of barns were built not long ago which were intended to be model barns for the neighbors. They cost $65,000 and were to house 65 cows. The barn rent per cow would be $100 a year. It takes a good cow to give $100 worth of milk at wholesale prices. There are many such examples in this state. Nearly all the so-called model barns are so expensive as to be impossible on a business farm. Henhouses ought not to cost much over $1 per hen. At this cost, the hen must lay a half-dozen eggs to pay her house rent. Many of the big poultry farms have such expensive buildings that the plant cannot possibly pay.

The danger of overinvestment in machinery is even greater, for there are skilled agents whose business it is to make sales. The average farm in Livingston County has an investment in machinery of $6 per acre of crops. Many a farm of an amateur has ten times this amount. The machinery on a general farm ought not to cost over $10 per acre of crops. The complete cost of maintenance, housing, interest, repairs, and depreciation on farm machinery amounts to about 25 per cent of the inventory value. A $10 investment per acre of crops represents a cost of about $2.50 per acre per year.

89. THE IMPORTANCE OF WORKING CAPITAL

Many a farmer who has apportioned his capital outlays wisely enough as between buildings, stock, and machinery, to be used upon a given acreage, fails at some critical stage of the year's business because of his failure to provide in advance a sufficient fund of what the business man calls "working capital." If the exigencies of the season demand the replanting of some fields or the hiring of extra harvest hands, special spraying to save a crop or special fertilizer to stimulate its growth, the fact that all the farmer's capital is already

tied up in the more permanent investments may mean that returns upon land, labor, and the capital already employed are much reduced. The producer of agricultural products, perhaps even more than the manufacturer, needs to foresee the whole cost of carrying his enterprise through to a successful completion. Often the race is lost on the home stretch.

It may be answered that in these later stages of the productive process the farmer can borrow such funds as he may need, upon the security of his partly finished product. This is, no doubt, very often the case. There are, however, at least two situations in which it is not true. Even in prosperous communities, it often happens that local funds are pretty well exhausted by the end of the planting season and summer and fall applicants for loans, no matter how good their credit, must be turned away. The other case is that of the less prosperous community, in which large numbers of the farmers are already using others' capital almost exclusively. The tenant farmer of the South, living and operating his farm upon store credit, has already pledged his crop—not infrequently for all or more than it will ultimately bring. Perhaps $25 used to hire more help at "chopping" time or to secure a more rapid picking of the crop in a threatening harvest season might return more in proportion than any other part of the capital outlay. In the absence of such further investment, serious loss results.

But probably the most striking case at the present time is in connection with the marketing of the farmer's products. Much of the pressure to sell is due to the farmer's inability to wait longer for the income from his season's crops. If he could allow his capital to remain tied up in the finished product until such time as the market should demand his goods for immediate consumption, the higher prices which he could then secure would well reward him for his waiting. But if he cannot defer his consumption, he cannot secure the rewards of waiting.

Our only purpose here is to point out the relatively high productivity which such "working capital" frequently possesses. Evidently this situation gives rise to two concrete problems, one for the farm manager in adjusting size of farm, choice of crops, and general organization, and the other that of our rural credit institutions. These will be treated in chapters vi and xv, respectively.

90. VARYING PRODUCTIVITY OF INDIVIDUAL UNITS IN THE SAME CLASS OF CAPITAL-GOODS[1]

By E. DAVENPORT

Again, no two individuals of the same species can be depended upon to give exactly the same quality of milk, for herd records show that the milk of different cows varies naturally from less than 3 per cent to more than 6 per cent fat. Nor is this dependent upon the food supply, for all authorities agree that the proportion of fat to other solids is dependent upon the individual and not upon her feed. Moreover, differences nearly as wide as these quoted may be found within the limits of a single herd and therefore under identical conditions as to feed. Still again, two individuals of the same breed will produce radically different amounts of milk or fat, whichever is measured, from identical amounts of the same kind of feed.

Three experiments were conducted to determine the limits of this difference between cows considered good enough for a place in a commercial herd. In the first, Eva produced 48 per cent more milk and 11 per cent more butter in ninety-one days than did Janet, and in so doing consumed no more garin and but 7.6 per cent more roughness. These cows were both mature, were fresh on the same day, and neither suffered accidents during the experiment, yet Eva produced 1,057 pounds of milk and 12 pounds of butter fat out of her extra feed of 112 pounds of hay and corn stover. The second experiment was a comparison between Rose, a native cow nine years old, and Nora, a native cow six years old. Rose commenced April 13 and Nora May 22, 1899, and both were milked for a full twelve months. Both were in good health, and both continued in good flow until the last, Rose averaging over 18 pounds of milk per day and Nora nearly 14 pounds for the last seven days of the test. Each consumed all the feed she cared to take, the only restriction being that its composition was the same for both. Neither was in any sense beefy, but Rose gained 181 pounds and Nora 165 pounds from August 1 to April 1, showing that they were evidently working at or near their limit of milk production.

Rose consumed slightly the heavier ration and yielded decidedly the larger product in both milk and fat. The accompanying table

[1] Adapted from *Principles of Breeding*, pp. 78–81. (Copyright by Eugene Davenport. Published by Ginn & Co.)

exhibits the total feed consumed and the product yielded for the entire period of twelve months.

COMPARATIVE MILK PRODUCTION ON BASIS OF FOOD CONSUMED

Cow	Feed	Milk	Fat	Butter
Rose	6,477.92	11,329.00	564.82	658.95
Nora	6,189.06	7,759.00	298.64	348.41
Difference	288.86	3,570.00	266.18	310.54
Percentage	4.67	46.01	89.13	89.13

Cast in verbal form, this means that Rose was able to produce 47 per cent more milk and 89 per cent more butter than Nora, with the consumption of 4.67 per cent more feed. Reducing both to the same basis of food consumed, it appears that with a given amount of feed *for every 100 pounds of milk given by Nora, Rose gave 139.5 pounds; and for every 100 pounds of butter fat produced by Nora, Rose produced 180.7 pounds.* For purposes of milk production, therefore, feed was worth 39.5 per cent more when fed to Rose than when fed to Nora, and for butter production it was worth 80 per cent more. This, then, is the true measure of the functional difference between these two cows, and it is good and sufficient ground on which to base breeding operations. Further, it is to be noted that this is not the difference between a good cow and a poor one but between two good cows; for Nora produced 348.4 pounds of butter, which, as Professor Fraser remarks, is nearly three times the average yield (130 pounds) of cows in the United States, and almost one half more than the average yield (250 pounds) of what are considered profitable cows in Illinois.

It may be added at this writing (1906) that Rose, though used in many experiments and exhibited at various state fairs and at the St. Louis Exposition, is still living, hale and hearty at sixteen years of age, and is still an economical producer of milk. She has an average yearly record of *384 pounds of butter fat* for ten years, and though she has been in many tests since the one just reported she has never been beaten but once. That was in the following case, which bears further on the present point. Three cows were in this test with Rose—Tina Clay's Queen, known to be a poor cow, and two natives, known as No. 1 and No. 3, supposed to be two of the four best cows

bought for experimental purposes out of a herd of one hundred. Reduced to the same feed basis, and taking the yield of Queen as 100, that of No. 3 would be represented by 121, of Rose by 304, and of No. 1 by 312. This is a rate of more than three to one against the poor cow, or over *two and one-half to one between good cows on the same feed basis*.

These are not isolated and peculiar cases. Professor Fraser, of the University of Illinois, tested 554 cows in 36 commercial dairy herds of the state for a full period of twelve months each. He found that the best 25 per cent of the whole number tested were able to produce an average of 301 pounds of butter fat per year, while the 25 per cent of lowest efficiency were able to produce an average of but 133.5 pounds—a range of considerably more than two to one. The practical significance of this difference is pointed out by Professor Fraser as follows: If it costs thirty dollars a year to feed the poorer cows and thirty-eight dollars a year to feed the better ones, then at present prices a herd of twenty-five of the latter will produce as much *net profit* as would a thousand of the former. A little calculation will show the immense saving in labor in keeping the smaller herd, and, what is equally significant, the relatively smaller investment in animals, feed, and barns, and the smaller volume of business generally.

91. PROTECTING THE FARMER AGAINST INFERIOR CAPITAL-GOODS[1]

The People of the State of Michigan enact:

Section 1. The term "commercial fertilizer" shall be held to include any and every substance, limestone or lime rock, imported, manufactured, prepared, or sold for fertilizing or manurial purposes, the retail price of which is ten dollars or more a ton. Every lot or parcel of commercial fertilizer sold, offered, or exposed for sale, or distributed within this state shall have on each bag or sack, in a conspicuous place on the outside, a legible and plainly printed statement in the English language clearly and truly certifying:

a) The net weight of the contents of the package, lot, or parcel;

b) The name, brand, or trade-mark;

c) The name and principal address of the manufacturer or person responsible for placing the commodity on the market;

[1] Public Acts of Michigan: Acts 135 and 227 of session of 1915; 202 and 254 of the session of 1913.

d) The minimum percentage of nitrogen in available form;

e) The minimum percentage of potash, K_2O, soluble in distilled water;

f) The minimum percentage of available phosphoric acid, P_2O_5, and also of total phosphoric acid;

g) And no other statements of chemical compounds except as above.

SEC. 2. Before any commercial fertilizer is sold or offered for sale, the manufacturer, importer, or party who causes it to be sold or offered for sale within this state, shall file with the secretary of the State Board of Agriculture a certified copy of the analysis and certificate referred to in section one, and shall also deposit with said secretary a sealed glass jar containing not less than two pounds of such fertilizer, with an affidavit that it is a fair sample of the article thus to be sold or offered for sale.

SEC. 7. The State Board of Agriculture by any duly authorized agent is hereby authorized to select from any package of commercial fertilizer exposed for sale in this state a quantity not exceeding two pounds, for a sample, such sample to be used for the purpose of an official analysis and for comparison with the certificate filed with the secretary of the State Board of Agriculture and with the certificate affixed to the package on sale.

The People of the State of Michigan enact:

SECTION 1. The Washburn and Moen gauge is hereby declared to be the standard gauge for testing galvanized wire fence within this state.

SEC. 2. The following test as to quality of galvanizing is hereby declared to be the standard test of the galvanizing of such fence within this state. The wire shall be thoroughly cleansed with a solution of soap, using a soft cloth or cotton waste. It shall then be immersed in a solution of copper sulphate neutralized with copper oxide and filtered, of a density of 1.186 at sixty-five degrees Fahrenheit. It shall be kept in this solution at a temperature of from sixty to seventy degrees Fahrenheit for one minute, then immersed in clear water and afterward wiped dry. After such immersion and drying, if the wire does not show a deposit of copper indicating that some portion of the zinc coating is entirely removed, it shall be considered as "one minute wire" as hereinafter mentioned. This test shall be immediately

repeated and the wire shall be graded according to the number of immersions it may be able to stand without showing a deposit of copper, and such grades shall be designated as "one minute," "two minute," "three minute," "four minute," etc., wire, in accordance with the number of minutes during which such wire respectively stood such test without showing a deposit of copper: Provided, however, That all tests shall be made on straight sections of stay or line wire and not on locks, wraps, or winds of such fence.

SEC. 6. It shall be the duty of the State Board of Agriculture to test all samples of all galvanized wire fence submitted to them for that purpose and to determine whether such fence is of the standard gauge and grades provided in this act. If they shall find such fence to be of such standard gauge and grades, they shall issue to the manufacturer or dealer applying therefor a certificate, good for one year from the date thereof, permitting such manufacturer or dealer manufacturing or selling such galvanized wire fence, to attach to each and every bundle of such fence of the same gauge and grade so tested, a tag or label bearing the following statements:

1. Name and address of manufacturer or dealer;
2. Date of expiration of certificate;
3. Date of manufacture of such fence;
4. Galvanizing test, whether "one minute," "two minute," "three minute";
5. Gauge of top wire;
6. Gauge of bottom wire;
7. Gauge of line wire;
8. Gauge of stay wire.

SEC. 7. Any person who shall sell or offer for sale any galvanized wire fence tagged or labeled with the tag or label prescribed in section six of this act without having the same tested as prescribed in this act and without paying the required fee and procuring the certificate provided for by this act, or which is found to be of an inferior grade or gauge to that specified on such a tag or label, when submitted to the test provided for in section eight of this act, shall be guilty of a misdemeanor (punishable by a fine of not less than one hundred dollars or imprisonment for a period not exceeding six months, or by both, and in addition shall be liable for all damages sustained by the purchaser).

NOTE.—Similar laws provide against the adulteration or misbranding of agricultural seeds, insecticides and fungicides, and com-

mercial feeding stuffs. All such concentrated feeds must be accompanied by "a chemical analysis, stating the percentages it contains of crude protein, crude fiber, nitrogen-free extract, and ether extract, all constituents to be determined by the methods adopted by the association of official agricultural chemists." "The secretary of the State Board of Agriculture shall publish in his annual report a correct statement of all tests and analyses made, certificates filed in his office, and fees received" under these acts.—EDITOR.

92. THE COST OF AN IRRATIONAL PURCHASING STANDARD[1]

BY J. F. STEWARD

Geographic differences as to farm requirements for machinery are the source of great perplexities to the manufacturer. Of *farm* wagons alone one manufacturer—not the largest—is required to provide an almost incredible number of kinds. If the kinds differed radically, matters would be simplified.

When I tell you of wheels alone 650 varieties are demanded, 500 running gears, and of bodies as many more, you will feel like doubting the fact. Of varieties of tongues and methods of securement there are very many more. And further, when you take into account the number of combinations that may be demanded of this one manufacturer—over 7,300—you who are not familiar with the subject may think I am romancing. In one region of the country one of the many kinds of body will be demanded, with a certain form of hounds or a certain form of the many wheels, and so it goes. If this were not the case—and it is made to be the case largely by precedent—the manufacture of farm wagons would be a simple matter, and prices would be materially lower. And when I say to you that the International Harvester Company, in one of its types of machine, puts out 110 kinds of binders, considered as shipment orders, you may think I am more than romancing. I do not mean that they differ in principles, but the varieties manufacturers are forced into by the demands must each be considered as a different machine, because its parts must be assembled, boxed, listed, stored, and shipped separately from all others. If I were to have my way, I would try to convince the farmer that it does not pay him to require that his whims be satisfied. It is in part because of his *whims* that agricultural machinery is so expensive. I

[1] Adapted from *Transactions of the American Society of Agricultural Engineers*, 1908, Vol. II, No. 2, pp. 39–40.

should like to beat it into the heads of those farmers that do not already know the fact, that no small part of the price they pay for some of their agricultural machinery is due to the necessity, on the part of manufacturers, to satisfy whims. It seems to me that our agricultural schools can do much to develop level-headed farmers, men whose choice, say of a wagon, will be the result of good judgment rather than the fact that he believes his father's type of wagon was best. A manufacturer cannot sell the same kind of wagon in Colorado that is demanded in the eastern states, although the conditions are practically the same. In the few good agricultural portions of the eastern states the western farm wagon finds no sale. This has been proven to the satisfaction of the makers who have fallen down in their efforts to produce a type of wagon that will serve a purpose the country over, wherever conditions are uniform. They have failed because *brain* conditions are not uniform. This is a matter of catering to the likes and dislikes of the buyer rather than supplying demands directed by his judgment.

D. Depreciation of Stock and Equipment

93. DEPRECIATION OF FARM MACHINERY[1]

By F. W. PECK

The annual depreciation in farm machinery is usually estimated at 10 per cent. The statistics gathered on these farms for the years 1902 to 1907 showed that the average depreciation of all machines was approximately 7.3 per cent. The farm records on practically the same farms for the years 1908 to 1912 indicate a slightly lower figure as the average depreciation on all machines. For the latter period approximately 6.7 per cent is the figure arrived at from the records as shown in Table XI. This is to be accounted for by the fact that these farmers have taken better care of their machinery. It has also been found that many of the machines that were purchased in 1902, 1903, and 1904 are in such good condition as to bring the rate nearer 6 per cent than 10. The longer such records are kept the more clearly is it shown that as machines grow older the rate of depreciation becomes less. For instance, a grain binder may seemingly depreciate

[1] Adapted from *Bulletin 145, Minnesota Agricultural Experiment Station*, pp. 24–25.

at the rate of from 10 to 12 per cent, but it is found that the machine will last much longer than eight or ten years. On the farms studied, many machines from twelve to sixteen years old are in use and apparently have considerable usefulness left.

Table XI shows the annual rates of depreciation of farm machinery which have been computed from inventories showing the original value, the years in use, and the present value of each machine. This takes account of the amount of work done and repairs during the year, present condition, and apparent future usefulness of the machine, as well as possible auction or exchange value. The annual depreciation in dollars thus obtained, divided by the average original investment, gives the annual rate of depreciation in percentage form.

TABLE XI

ANNUAL DEPRECIATION OF FARM MACHINERY EXPRESSED IN PERCENTAGES

Machine	Northfield (Rice County)	Marshall (Lyon County)	Halstad (Norman County)	1,820-Acre Farm (Norman County)	640-Acre Farm (Stevens County)	Average All Machines
Grain binders	7.77	7.81	5.45	5.74	8.40	6.54
Grain drills, seeders	6.20	4.61	4.59	4.72	6.25	5.06
Corn binders	9.06	8.25	7.09	4.44	6.89	7.97
Corn planters	6.97	5.76	5.12			6.41
Corn cultivators	5.31	10.92	5.27	4.48	5.10	6.23
Mowers	6.15	9.60	5.19	7.95	8.26	6.80
Hay tedders	3.96		5.28		4.65	4.21
Hay loaders	8.72	7.18	6.67			7.37
Hay rakes	6.48	8.13	4.80	6.44	6.35	6.30
Gang plows	8.20	6.48	5.14	6.98	7.07	6.41
Sulky plows	9.57	9.50	6.05			8.34
Walking plows	6.08	3.16	5.11		8.23	5.85
Wagons	4.32	4.04	4.33	2.81	4.26	3.89
Harrows	6.62	6.64	4.04	7.94	6.25	5.88
Disks	4.57	7.85	5.88	3.80		5.29
Manure spreaders	9.84	11.76	8.10		14.44	10.37
Hay racks	10.00	15.11	12.50	5.11	14.28	8.54
Reapers				9.27		9.27
Grain tanks	3.85		5.52	3.77		4.03
Sleds	4.25	4.88	6.99	5.38	8.00	5.94
Fanning mills	4.36		2.74	4.09	5.02	3.74
Horse weeders					5.20	5.20
Harness (heavy)	5.91	7.65	5.08	3.67	4.17	5.54
Gas engines	7.26	7.16	4.30		9.17	5.69
Silage cutter	7.43					7.43
Separators	7.66	8.47	7.65	8.00	7.10	7.92

94. WASTE OF CAPITAL INVESTED IN FARM MACHINERY[1]

By E. M. D. BRACKER

Wasteful practices with farm machines occur to a greater or less extent on almost every farm. These cause a very large annual loss. To prevent this loss the farmer should master the details relative to the selection, adjustment, and care of machines. Few farmers, comparatively speaking, have a thorough knowledge of the machines they are using. [There then follow thirty-six pages devoted to discussion of technical details of material, design, adjustment, and points to be borne in mind in selecting a machine suitable to the task to be performed.—EDITOR.]

Many farmers are penny-wise and pound-foolish in their farming operations. Great care will be taken to insure maximum yields and to gather the harvest so carefully that none of the crop spoils or is lost. A farmer exercises great care in these respects because otherwise his income might be reduced one or two hundred dollars. Yet the same farmer's income may easily be lessened this much or more by his neglect properly to care for the machines with which his crops were tended.

It is essential that all machines be protected from the elements while not in use, and a building should be provided for this purpose. Investigations upon the depreciation of farm machines, made at the Minnesota Agricultural College, show for twelve common farm implements annual depreciations ranging from 6.75 per cent to 11.78 per cent. These figures apply to machines which have been housed. Authorities estimate that machines depreciate twice as quickly when they are not housed.

Just to see how the neglect to protect his machines from the elements affects the farmer's income we will take a farm which requires $600 worth of machinery properly to equip it. The average western Oregon farm requires about this outlay in farm machinery. If these machines are properly housed they will depreciate approximately $48 in value each year, but if they are not carefully housed the depreciation may be at least $96 each year and in some cases very much more. It is evident that the money invested in the building will yield a dividend which would soon repay the cost of the building. After this is paid for, the farmer will find that the dividend is quite

[1] Adapted from *Experiment Station Bulletin 133, Oregon Agricultural College*, pp. 3, 11, 38-41.

a factor in increasing his annual income. In addition to this, if the farmer should desire to sell some of his machines at any time he will find that they will bring a much higher price if they bear evidences of careful housing than they would if they were weather-beaten in appearance.

Likewise, when machines are not properly housed but are exposed to the elements during idle seasons, much more time and effort is required to get them working properly. This extra time and effort is frequently expended during the busiest season, when the farmer's time may easily be worth several dollars an hour. It often falls to the lot of farmers who are indifferent about housing their machinery, to have the trying experience of getting a harvesting machine to do even a poor grade of work when the crops are spoiling. No doubt there are many costly experiences during the lifetime of such farmers, any one of which might pay for the entire cost of building a suitable machine shed.

While it is essential that machines be properly cared for while not in use, it is also essential that they be properly cared for while they are being used. When a machine is operating in perfect adjustment it has a characteristic sound. A careful operator of machines, knowing this sound, is able to detect at once when anything is wrong and stops immediately to find the cause of the trouble. It may be that the discordant note was caused by a bolt which has become loose. If this bolt is tightened at once the machine is again in perfect running condition. If, however, the loose bolt is not given immediate attention it means, in many cases, the breaking of a part that causes a delay of several days.

It is a splendid plan to go over the machine after the day's operations, adjusting bearings and gears for wear where it is possible to do so, tightening loose bolts, making sure that the lubricating devices have been working properly and that the cutting parts are sharp. The machine may be examined at any time most convenient after the day's run. If this plan is followed systematically, it will require but a few minutes' time each day and will prevent many breakages that, because of the delay in waiting for repairs, are far more costly than the mere expense of their replacement. A machine kept in constant repair will also have a longer life and give more satisfactory service than one that is repaired in a haphazard way.

NOTE.—"It is a well known fact that more machinery is worn out through misuse and neglect than from actual wear. Many farmers

leave their $125.00 grain harvester standing out in the weather instead of building a suitable machine shed, and the plow and harrow often receive the same treatment. This condition exists generally throughout the Middle West, and Wisconsin farmers are seemingly as negligent as those of any other state. Reports from 150 members of the Wisconsin Agricultural Experiment Association indicate 207 machines out of a total of 695 as being housed in suitable sheds. From observations made from traveling over the state, the figures give a fairly good representation of the care which the average farmer gives his farm implements."—*Twenty-third Annual Report of the Agricultural Experiment Station, University of Wisconsin*, p. 285.

95. DEPRECIATION OF LIVE STOCK[1]

By W. J. SPILLMAN[2]

The data obtained in a survey of 643 farms in Chester County, Pennsylvania, make it possible to calculate the rate of depreciation on dairy cows, as well as on farm horses. The rate obtained represents approximately the average charge which must be made for depreciation in determining the cost of maintaining a dairy herd.

TABLE LV

Showing Depreciation of Dairy Cows on 378 Farms Operated by Owners, Chester County

	Number	Value per Head	Total Value
First inventory	4,196	$56.10	$235,400.00
Cows purchased	589	63.84	37,605.00
Cows raised	345	63.84	22,025.00
Total			$295,030.00
Second inventory	4,164	$57.01	$237,430.00
Cows sold and slaughtered	895	37.36	33,437.00
Total			$270,867.00
Difference			$ 24,163.00
Increase at end of year in value		$0.91	3,789.00
Total loss			$ 27,952.00
Average investment			236,415.00
Rate of depreciation, percentage			11.82

[1] Adapted from *Bulletin 341, Office of the Secretary, United States Department of Agriculture*, pp. 93–96.

[2] H. M. Dixon and G. A. Billings, joint authors.

The results of the calculation are somewhat surprising and the figures for different regions vary widely. While Chester County shows an average annual depreciation in value of 11.82 per cent, a similar calculation for an important dairy center in southern Michigan showed only 4.07 per cent. This remarkable difference is due mainly to the difference in prices at which cows are bought and sold in the two localities. In the Michigan locality the average price paid for cows by dairy farmers was $48.48. The average price at which these same farmers sold their discarded cows was $42, a difference of only $6.48. In the Pennsylvania locality the average purchase price was $63.84 while the average sale price was $37.36, a difference of $26.48. The Pennsylvania farmer thus loses $20 more per cow bought and sold than does the Michigan farmer. This accounts for the much larger annual charge for depreciation on the Pennsylvania farms.

The rate of depreciation of farm work horses in these same localities was also calculated by methods similar to those used in the foregoing table for cattle. In both cases the annual rate is very close to 5 per cent, being 5.09 in Chester County, Pennsylvania, and 4.87 for the 300 farm-owners of Lenawee County, Michigan. The rate is largely determined by the practice of farmers of disposing of horses while they are still salable at a fairly satisfactory price. If all farm horses were kept until their usefulness was at an end, the depreciation on them would undoubtedly be much greater than the results here found. The death-rate would also be much greater. On the average, the farmers of the Michigan locality keep a horse 8.5 years and sell him then for $18.68 less than they paid for him. The Pennsylvania farmer, on the other hand, keeps his horses an average of 12.1 years, and then sells them for $29.34 less than they cost originally.

NOTE.—*Bulletin 295* of the Cornell Experiment Station says (p. 494): "The loss from decrease in value of sheep sold is greater than the losses from deaths. This loss due to selling old sheep, together with the deaths of sheep, would give a depreciation and loss of 10 per cent as contrasted with 4 per cent for cows. The deaths among sheep averaged 39 per thousand, while the deaths among cows averaged only 12 per thousand." Professor Warren mentions elsewhere (*Farm Management*, p. 235) that "hogs grow enough so that old ones are worth more than young ones, but the losses from death are very heavy. On the average, two-year-old horses may be expected to live about 12 more years. The average depreciation on a large number of horses would, therefore, be a little over 8 per cent.

Horses usually do little work before they are three years old, and do not do full work until about four years old. For work animals, the depreciation would, therefore, average about 10 per cent." He points out also that the death-rate among pure-bred and highly graded cattle is higher than among common stock. Since the average period of usefulness is not longer for the former than for the latter class, the yearly depreciation is considerably greater. He estimates it at 4 per cent for $40 cattle, 10 per cent for those having a value of $100, 12 per cent for those worth $200, and 13 per cent for those worth $300. The cost of feed and care and the interest charge in these latter cases would also be larger, but such stock "usually gives very much higher returns."—EDITOR.

E. The Accumulation and Conservation of Capital

96. THE SERVICE OF CAPITAL AND THE MEANS OF SECURING IT[1]

BY T. N. CARVER

There is no mystery about credit or capital. Capital consists of tools and equipment, though sometimes we speak of it as though it were the money necessary to buy the tools and equipment. Capital and land are the factors which call for investment by the farmer. Thus the large use of capital in farming has come because of the invention of agricultural machinery. When farming was done with few very simple tools, most of which were made either by the farmer himself or by the local blacksmith, capital did not play a large part in agriculture. Another way of saying the same thing is that it did not take much money to buy all the equipment the farmer needed or knew how to use. The purchase of land was the only thing requiring much money, and land, in this country, was either free or very cheap. Therefore, there was very little money required to start in agriculture. At the present time, not only is the price of land rising, but the equipment of a farm requires more capital because of the increased use of improved machinery. This is likely to increase more and more as the years go by.

Capital is brought into existence in only one way—that is, by consuming less than is produced. If one has a dollar, one can spend it either for an article of consumption, say confectionery, or for an

[1] Adapted from *Farmers' Bulletin 593*, pp. 1–2.

article of production, say a spade. He who buys a spade becomes a capitalist to the amount of a dollar—that is, he becomes an owner of tools. The process is precisely the same, whether the amount in question is a dollar or a million dollars. If he does not have the dollar, his only chance of getting the spade is either to borrow it or borrow the money with which to buy it.

There are only two ways of securing capital for the equipment of a farm. One is to accumulate it oneself, by consuming less than one produces; the other is to borrow it. The advantage of borrowing is that one does not have to wait so long to get possession of the tools and equipment. One can get them at once and make them produce the means of paying for themselves. Without them, the farmer's production might be so low as to make it difficult ever to accumulate enough with which to buy them. With their help, he may be able to pay for them—that is, to pay off the debt in a shorter time than it would take to accumulate the purchase price without them. That is the only advantage of credit in any business, but it is a great advantage to those who know how to use it.

There is no magic about credit. It is a powerful agency for good in the hands of those who know how to use it. So is a buzz saw. They are about equally dangerous in the hands of those who do not understand them. Speaking broadly, there are probably almost as many farmers in this country who are suffering from too much as from too little credit. Many a farmer would be better off today if he had never had a chance to borrow money at all, or go into debt for the things which he bought. Shortsighted people, who do not realize how inexorably the time of payment arrives, who do not know how rapidly tools wear out and have to be replaced, or who do not keep accounts in order that they may tell exactly where they stand financially, will do well to avoid borrowing. Debts have to be paid with deadly certainty, and they who do not have the wherewithal when the day of reckoning arrives become bankrupt with equal certainty. However, that is no reason why those farmers who do know how to use credit should not have it.

97. RURAL THRIFT AND THE CAPITAL FUND

It is customary to point out in discussions of the capital factor, that the ultimate determinant of the size of the capital fund is to be found in the degree of thrift which a society possesses. It is then

pointed out that institutional aids to such thrift play an important part. Our chapter on consumption has already pointed out that country people have generally turned a large part of their net income back into the business. Both there and in the present chapter we have suggested that in this process of saving they have sometimes done not wisely but too well. They have pinched highly necessary forms of consumption expenditures in order to make capital outlays of dubious value. Such errors are to be remedied rather by better instruction than by more aggressive institutions to promote saving.

However, the problems of thrift and thrift institutions are beginning to come into greater prominence today in the more prosperous agricultural sections of our country. For example, in the rich communities of the Corn Belt, many farmers are receiving net incomes in excess of the needs both of good living for the farm family and of adequate maintenance and betterments of the farm. In such regions local banks have been growing very rapidly in recent years. They have attracted large accumulations of capital, which otherwise would very likely have gone for the less pressing consumption wants, such as touring cars, or the less productive forms of farm outlay, such as stone barns and ornamental fences.

Such accumulations of capital in county banks are then available on a loan basis for the better equipment of the younger or less well-to-do farmers of the community. Specifically, country banks have been a serviceable means of keeping the capital of the retiring farmer still at work in the country, instead of being invested in town lots or railway bonds. This is an important service, because the increase in the amount of capital needed in modern types of scientific agriculture creates a demand for a fund larger than can be accumulated from current operations. It is evident that the modern business farmer is often in a position to make productive use of capital much larger than what he can himself supply.[1] Whether these additional funds be the surplus of older or more fully developed farming sections or the savings of non-agricultural populations, it is highly desirable that a means be found for putting them to work in agriculture. This is an important phase of the problem of rural credits (see Chapter XIV).

[1] This is the normal situation of the business enterpriser, in whatever line of production.

98. THE RÔLE OF INSURANCE

Sudden destruction of capital as the result of fire, wind, and hailstorms, or the death of stock has been a frequent source of disaster to the farmer. Such losses may be looked at from two points of view. First, there is the social aspect of the case. If property has been actually destroyed, the total equipment of the nation or of the industry has been, by so much, curtailed and its efficiency reduced. This loss cannot be compensated, though new effort and saving may in time accumulate a new stock of goods. Obviously, mere insurance settlements do not alter the fact of such loss to society's productive plant.

But there is also the individual aspect of the matter. While insurance cannot restore the burned building or the dead animals, it can restore their value, in part at least, to their former owner. Thereby it enables him to replace his property and continue his business. It protects his personal capital by distributing his losses over many who have not so suffered. And the logical development of the business of insurance is to bring about systematic efforts toward the reduction of losses, by the introduction of preventive measures. If the farmer is induced to be more careful concerning lanterns in the barn or to take greater precautions against thresher fires; if his premises are inspected by the veterinarian of the live-stock insurance company, diseased animals eliminated, and sources of infection removed, what began as an effort to protect the capital position of the individual becomes a means of conserving the capital of society as a whole.[1]

[1] For a discussion of farmers' mutual insurance companies, consult Powell, *Co-operation in Agriculture;* Valgren, *Quarterly Journal of Economics*, XXV, 387.

VI

ORGANIZATION AND MANAGEMENT OF THE AGRICULTURAL ENTERPRISE

Introduction

We come now to the very heart of the problem of agricultural production. Here we pass from the study of concrete objects to a consideration of abstract relationships. We have been talking of physically measurable qualities of soil and climate, human beings, livestock, and farming implements. Our task there was somewhat similar to that of the chemist when he studies the various elements of which our earth is made. Now we pass on to study the behavior of these elements when they are brought together under different circumstances, and to ascertain the qualities, good and bad, of the different compounds so produced.

By doing this we hope to learn how to bring together the right quantities of the proper ingredients under conditions favorable to desired forms of activity. The chemist who knows the valences of the elements with which he is dealing and the laws of their behavior under different conditions of heat and pressure can teach the manufacturer to avoid waste by using his materials in their proper combining proportions, and to secure a desirable and salable product instead of the uncertain or inferior product of chance mixtures or unfavorable conditions. Dependable and profitable results can be regularly secured only by those who possess knowledge of the properties of the materials and forces with which they work, and secure thereby control of their operation.

The same general principle holds good in the case of economic organization. Fundamental to our study of the effective organization of agricultural enterprise, therefore, is an understanding of the law of combining proportions, which is but the broader application of the law of diminishing returns, already studied in its particular bearing upon the land factor. In selection 100 Professor Carver demonstrates that, under given circumstances of agricultural technique and market conditions, there will be one most profitable (and many less profitable) combinations of labor and capital which might be applied to a given

parcel of land; there is also an amount of land and of equipment with which a given individual can work most profitably; and some particular amount of land upon which and of labor with which a given piece of capital equipment can secure the greatest return.

To all this Professor Taylor adds the observation that these *combinations* of land, labor, and capital likewise take on *group* properties of their own, and that the injudicious combining of these industrial composites results in low proportionate return to those which are in excess, in a way similar to that displayed in combinations of the separate factors. In terms of the farmer's problem this means merely that he must answer questions of organization external to his particular farm as well as those which are internal to it. He must ask himself whether any certain line of farm production be in a stage of diminishing returns as compared with other lines, or even whether agriculture as a whole shows a smaller proportionate return to land, labor, and capital used in it than to equal quantities of these factors directed toward trade or manufacturing enterprise. A decade ago many of our best young men exercised their entrepreneur function by deserting the farm and helping to direct land, labor, and capital to the more profitable industrial employments. Today many city boys are turning toward the country, and much city capital is being diverted to our agricultural lands. Each back-to-the-land-er adds his influence in favor of a new organization of our whole economic system.

As to the choice of farm enterprises, or lines of production, it is quite evident that no set rule can be laid down. The agricultural scientist, to be sure, can tell us quite definitely what are the technical possibilities of a given farm or region, but the determination of economic expediency (which means maximum profitableness) is another, and more complicated, matter. In the latter case, costs of production under the given conditions of agricultural technique, transportation facilities, and market situation are not less important than soil content, rainfall, and temperature. The agricultural scientist concerns himself with a gross physical product, the agricultural economist with a net-value product. A reading of selections 103 and 104 will serve to show some of the examinations and comparisons which the farmer must make in deciding which enterprises would be most profitable.

A choice of enterprises having been made, it might seem to be a comparatively easy matter to organize the working plant for efficient production of this output. Here, however, the farmer is confronted by certain difficulties which press upon him more heavily than upon

his brothers in other lines of industry. He is far from being as free to enlarge or diminish the size of his labor force as is the manufacturer, hiring, discharging, and hiring again from an ever-available labor supply. Nor can he shut down his plant for three months or a year, or curtail or increase his acreage in mid-season to offset weather conditions or to meet market developments. Farm projects move in cycles of from one to several years. Idle horses must still be fed, other stock must be kept up, and satisfactory laborers must be hired on a season's contract.

Likewise, the farmer often finds the size of the units of one or more of the productive factors with which he must work fixed by forces only partially within his control, and dictated by considerations other than those of technical efficiency in his enterprise. For example, the 160-acre farm is an institution in this country whose reasons for being are to be found in the book of the surveyor, not in the intention of the farmer. So, too, the size of the labor force must all too often coincide with the numbers of the family group, rather than with the labor needs of the enterprise. Commonly the size of the capital factor has been predetermined by the amount of wealth accumulated by the farmer or inherited from his father, instead of being an amount ascertained as necessary to maximum efficiency of operation.

The ideal of farm organization would run something like this: Once the enterprise was determined upon, it would be equipped with such number and grades of workers, such quantity of land, and such capital as would give it its greatest technical efficiency. What we find in practice is strongly in contrast with this ideal. The farmer has, let us say, 160 acres of ground, and could rent only in 160-acre or perhaps 80-acre tracts, if at all. He has had his own labor and such aid as a wife, a son, and two daughters could render him, but has had limited opportunities of hiring what other help he needed and when he needed it. He had, perhaps, a capital of $5,000 and inadequate facilities for borrowing other funds when they were needed in the enterprise. With so large a number of limiting factors, each set by circumstances unrelated to the technical requirements of farming or to each other, the farmer has stood little chance of bringing his organization to its largest profit-making point.

There are two possible lines of attack upon problems of this sort. First, we may attempt to remove the disabilities under which the farmer works. Later chapters (on land tenure, labor problems, and rural credits) set forth some of the suggestions which have been

offered for solving these problems. But, even if we succeed in bettering our conditions in these particulars, it is evident that the farmer will continue, as long as our world is one of human imperfections, to face handicaps of this same general kind. Labor will never become entirely mobile, and capitalists can never arrive at the point where their judgment is infallible as to the size of loan which should be granted particular security of each individual desiring to borrow. Even the best of institutions cannot furnish us with all the labor and capital that we want; agriculture must expect in the future as in the past to find one of its serious problems in economizing its use of factors of production which are scarce and therefore costly.

Section E indicates a group of problems of this general sort, and they are similar to those which producers in all other lines must likewise face. To meet them more intelligently, the manufacturer has called in various experts, and together they have devised methods of efficiency and economy which now pass under the general title "scientific management." Suitable buildings and logical arrangement of the plant, time studies, the scientific adjustment of machines and choice of tools and materials, careful shop organization—these, together with special systems of payment designed to stimulate effort, are its essential features.

Obviously not all this system is adaptable to the farmer's use. But, on the other hand, its most important elements are. Farming is fast losing its slipshod and rule-of-thumb character, and is coming to depend upon scientific scrutiny of cause and effect and careful measurement of outlay and return. The methods of science enable the farmer to compare the cost of fertilizer with the increase in yield or improvement in quality of the product. His beets are tested for sugar content, milk for butter-fat, and wheat subjected to both chemical analysis and actual baking tests. The returns from a given use of feed and labor by the hog-raiser are measured in terms of pigs that mature early, give a high yield of bacon, hams, and lard, and but modest contributions to the fertilizer tank. Modern farm management works out as carefully as does modern factory management the most efficient construction and arrangement of buildings, use of equipment, and schedule of work. Hired help is checked up by milking records or other means of gauging their productivity. Comparative studies are made of the amount of labor done by horses on a given outlay for feed and upkeep, with the cost and performance of mules, steam tractors, and gas engines. The farmer of the future

will need to scrutinize his operating costs as closely as does the manufacturer today, if he is to protect his margin of profit between outlay and return in the competition which is sure to grow keener with the passing of the years.

Finally comes the question of the form of business association under which the industry is carried on. In general economics we commonly recognize five types of organization in which producers may associate themselves together for the carrying on of their economic ventures. These are known as individual enterprise, partnership, corporation, co-operation, and government operation—or socialism. Each of them possesses certain weaknesses peculiar to itself, and each has demonstrated certain strength or fitness which has caused it to become established in some department of our economic life. Section F attempts to set forth some significant aspects of the relationship of the different forms of organization to the business of farming. Certainly there is no thought that the family-farm is going to be abolished; nor, on the other hand, should there be any thought that the farm business is going to be immune to the more complex and more efficient types of business organization which have evolved during these latter days in industrial pursuits. The real question is whether agricultural workers are going to develop a new hybrid form of business association which shall retain the constitutional vigor of the individual enterprise and yet add to it those specialized efficiencies which characterize the larger productive units which have been evolved in modern trade, transportation, and manufacturing enterprises. If we are to understand the true meaning and possibilities of co-operation, we must analyze it in terms of ability to organize land, labor, and capital effectively for economic production. Appraisal of its social or political promise should rest upon this foundation. It is the purpose of selection 120 at least to define some of these underlying issues.

A. The Meaning of Economic Organization

99. THE FUNCTION OF THE ORGANIZER[1]

By FRANK A. FETTER

Every separate thing that enters into the making of goods is called an economic agent; as in agriculture, the seeds, plows, fields, fences, barns, cattle, and labor; in manufacture, the buildings,

[1] Adapted from *Economic Principles*, pp. 317, 327–42. (Copyright by the Century Co.)

machines, material, labor, etc. But these numerous agents fall into two great groups called factors of production, variously named as man and nature, labor and material agents, or humanity and wealth. We must bear in mind that they are complementary agents and complementary factors: labor in a void and wealth without labor would be equally useless.

Man is not content merely to gather what is provided, but intervenes to direct the course of industry. Every act of labor and every use of goods calls for some decision and direction. The owner of a fund of purchasing power cannot leave it to invest itself. The primary function of enterprise is the choice of a business in which to invest; the next, and essentially last function, is to provide competent management. Even for the solitary worker the choice of the right time, kind, place, and method of work is most important. There is also a wide range of choice in the distributing and combining of labor, agents, and materials. A limited supply of agents can be used to secure a variety of goods, more or less desirable. There is a choice in ways and methods by which a thing may be done. There are many wrong ways, there is but one best way, at any stage of industrial progress. While most work is done in customary ways and little independent judgment is required, yet in every kind of industry new problems constantly arise and call for the exercise of choice as to methods. The ability to choose and to do wisely is an element in personal skill in every economic activity. This quality in the man is managing ability, and the action of directing economic activity is business management.

When various industrial groups are associated, direction becomes still more important, and the need grows for high ability to manage and direct the great units of industry. In the single group it is an internal harmony alone that is needed. The work of a dozen men must be so arranged that each is in his fitting place. But as this group comes into contact with others, the relationship becomes twofold, and there must be both internal and external harmony. Outlook upon business conditions and commercial ability become necessary. The more complex the economic organization of society, the greater the chance of mistake and the more injurious are the mistakes to a wide range of interests. Large amounts of wealth and labor can be rapidly lost through lack of wise direction of an associated group.

Ever since the beginning of human society some degree of organization of industry has existed. In every community by some method, however crude, a practical way has been found of determining who

shall organize and manage the factors of production, and who shall work under direction. By the ceaseless working of competition, the higher places are taken by those fairly capable of filling them, those less capable of managing industry come under the direction of those who on the whole are more capable, and the efficiency of the management of business as a whole is maintained or increased.

Many a man succeeds admirably in minor tasks of direction, but has his limitations, whether due to natural endowment or defects of education. A man may have just the qualities fitting him to manage a small gang of men whom he can see, know, and direct personally, but be unable to succeed where some power of imagination and some ability at constructive planning are required. A good departmental head may be a poor general manager.

The highest function of the management, that which properly is performed by the chief of the organization, is to form the general commercial policy of the enterprise. Every active investment is made in some generally predetermined line—it is merchandise, agriculture, manufacture, transportation, etc., and more specifically is wholesale stationery, general farming, iron making, teaming, etc. From the moment the general investment is made the management begins to exercise the power delegated by the enterpriser, investing and reinvesting, shaping and reshaping the business in accordance with a continuous policy. In a degree varying with the kind and size of the business, demand must be anticipated. The trend of changing fashion, in engineering as well as in dress, the shifting of demand for products, must be foreseen and prepared for not too rashly or too cautiously. The process in every kind of undertaking, that of buying and selling, as well as that of manufacturing, takes time. Materials and labor are to be embarked in directions from which they cannot be recalled. The widening or narrowing of the scope of the enterprise (as to variety of goods, extent of the market sought, etc.) and the enlargement or reduction of the size of the plant are decisions wisely made only by a mind with a large business outlook. The larger the investment and the more complex and distant the factors, the greater is the difference of loss or of gain made by the manager's judgment. The man who has the ability to do this exceptionally well in the largest business merits the title of a "captain of industry." He is not a mere employee of investors, but a prominent personality, whom investors follow, eager to assume the financial risk under such leadership.

The conduct of any business may be thought of as consisting of three parts, or processes: (1) buying, (2) alteration (i.e., recombination, elaboration, change in form, place, and time), (3) selling. These are continuous until the last sale is made and the whole business is ended. Buying and selling make up nearly all of mercantile business, alteration being subordinate; whereas alteration is the most striking feature of manufacturing, in which buying and selling appear (often mistakenly) to be quite unimportant.

Almost every business today requires from time to time additions of capital, temporary or permanent. Frequent use must be made of credit. The confidence and support of lenders, whether banks, trust companies, individual shareholders, or investors in bonds, must be secured by the management. Good judgment of the money market often is as vital as judgment of the market for the particular product.

The large classes of goods which are to be bought are equipment, materials, and labor. In the main the prices of these things are determined by impersonal forces and can be only slightly modified by a particular buyer. This is especially true of many staple goods. The manager can but look upon the price of these materials as fixed, and seek to combine them as economically as possible into other products. But there are many special patterns and qualities which have no true market-price. By close attention, good judgment, skilful bargaining, one man may be able to buy slightly cheaper than his competitors, and thus have an advantage over them at the outset. When he does this, it is usually by searching out a better market in which to buy, buying at a better time, and judging better than his competitors the quality of the goods.

Not the least important factor to be bought is labor of every grade. The more successful business men are not found usually paying less than their competitors for the various grades of workers. Success is due rather to utilizing the services so as to make them more effective.

The factors bought—equipment, materials, and labor—are to be skilfully and economically combined to secure a product worth more than it cost. Indeed, the very buying of them in certain quantities and of certain qualities implies and requires a decision, more or less exact, as to how they will be used. For the performance of this task of combining the factors a management must have, somewhere in the personnel, adequate technical knowledge of methods, processes, and materials, and experience in the art of applying the knowledge. In

small undertakings, the owner-manager must personally embody these qualities, but in more complex organizations the chief executive may do without all but the broadest knowledge and ability to judge of the results of different processes, and to compare different plans. The technical knowledge of details must be supplied by numerous specialists, working under his direction—engineers, draftsmen, pattern-makers, chemists, mechanics, efficiency experts, cost-accountants, etc.

The management must, with whatever aid it can get, choose the general processes to be used, the kind of machinery, the order and arrangement of it, the kinds of material, etc., and the various technical processes, chemical and mechanical, by which these are to be manipulated. Not less important, the management must choose and direct the corps of workers. Workmen must be selected with a due degree of skill, but not of a grade of skill, and therefore of wage, higher than is needed for the task. In a small business a manager's tact in handling men is one of the most important qualities, and, as the organization grows, foremen with managing tact must be hired.

The right proportioning and skilful substitution of the factors is a delicate technical task for the management. The enterpriser must constantly study the question whether the application of another unit of any one factor at the price will, following the principle of proportionality, add to value of the product as much or more than the cost. This calculation is made for every one of the minor factors entering into the business, and for the business as a whole. The proper proportion varies at different prices, or costs. If wages rise, "it pays" to get machinery; if wages fall, it pays to let some of the machinery deteriorate and to do more by hand labor. Likewise there is constant substitution of the various materials. The right proportions change constantly with inventions. A model factory is so proportioned that the buildings hold the right number of machines, with the right amount of space for the workmen, and the right amount of power. If there is more of a single factor than the ideal proportion, it is an unnecessary cost.

In the adjustment of processes to changing market conditions, many opportunities for business judgment are presented. The agents employed in any industry range from the more valuable down to the less valuable grades in a more or less regular series. A great mass of unused agents lie just below the margin of utilization in every industry. Many agents not actually earning an income may do so through a change in business conditions. Great quantities of the

poorer grades of wealth, even of those things that are relatively fixed in quantity, lie unused. Great areas on the edge of civilization still await the pioneer, the prospector, and the miner. Here is a source of wealth and a field for enterprise, to take these unused things or things imperfectly used and convert them into effective agents.

100. DIMINISHING RETURNS FROM EACH OF THE FACTORS OF PRODUCTION[1]

By T. N. CARVER

To say that the farmer knows better than to concentrate all his energies on his best land is the same as saying that he knows and acts upon one of the fundamental laws of economics, viz., the law of diminishing returns, though, like the *Bourgeois Gentilhomme* who was astonished to find that he had been talking prose all his life, our farmer might be surprised to learn that he was acting upon an economic law. This law of diminishing returns is simply a part of the general observation that the product of any given piece of land does not, even under the same conditions of soil and season, bear a constant ratio to the amount of labor and capital used in producing it. That is to say, the product does not vary in the same proportion as the labor and capital, increasing in proportion as they increase, and decreasing in proportion as they decrease. This simply means that there are several factors in the production of any crop, including labor, capital, and land, and that the amount of the crop is not determined by any one or any two of these factors, but by all of them combined. Labor and capital, being only a part of the factors, cannot alone determine the crop. It is well known to practical men that a niggardly application of labor and capital to a piece of land in the cultivation of any crop is little better than wasted, because it will produce so little in proportion to itself; whereas a more generous application will yield a crop not only larger, but larger in proportion to the amount of labor and capital employed. Up to this point the land is said to yield increasing returns to the labor and capital employed in its cultivation. But if the amount of these factors used in cultivating a given piece of land is still further increased, a point will eventually be reached where the product will no longer increase as fast as these factors are increased. Beyond this point the land is said to yield diminishing returns to the labor and capital employed. Though larger

[1] Adapted from *The Distribution of Wealth*, pp. 55–77. (Copyright by the Macmillan Co.)

applications of labor and capital may continue to produce larger crops, the crops will not be so large in proportion to the labor and capital.

In growing such a specific crop as corn, for example, a single day's labor of a man and team with the appropriate tools, if spread over a whole ten-acre field, would be thrown away because it would produce no crop at all. Five days on the same field might produce something of a crop, but it would be a poor one. Ten days would certainly produce more than twice as large a crop as five, and twenty days' labor might possibly produce more than twice as much as ten. But forty days' labor would hardly produce twice as much as twenty, eighty would certainly not produce four times as much, and two hundred days' labor would fall far short of producing ten times as much. If these assumptions are true of the particular field in question, it could be said to yield increasing returns up to the point where twenty days' labor were expended. Beyond that point it would be said to yield diminishing returns.

In discussions of this subject, confusion has sometimes resulted from a failure to distinguish the law of diminishing returns from a somewhat similar law relating to the comparative economy of large- and small-scale production. It is, for example, sometimes stated that manufacturing is carried on under the law of increasing returns, because a large factory can be run more economically, and turn out its products at a lower cost, than can a small one. But this is quite different from saying that a large factory can be run more economically than a small one on a given piece of land, or that it would not be necessary to use more land in connection with a large factory than with a small one of the same kind.

Each business or industrial unit, such as a farm, a store, or a factory, is a combination, under one management, of various factors of production, which are usually included under the three heads—land, labor, and capital. Among the various questions which the manager of such a unit has to determine are the two following: (1) What is the best *proportion* in which to combine the various factors? (2) What is the best *size* for the whole business unit? The law of diminishing returns has to do only with the former of these questions. That is to say, it relates to the varying productivity of an industrial unit when the factors are combined in varying proportions. On the other hand, the law which relates to the comparative economy of large- and small-scale production has to do primarily with the size of the unit rather than the proportion in which the factors are combined.

The difference between these two laws can be expressed in a more compact form by means of the following formulae, which are not to be understood as in any sense proving the existence of the laws, but only as expressing them in convenient form.

	Acres of land		Units of labor and capital		Product
I. If	X	with	Y	will produce	P,
II. then	X	with	aY	will produce	more than aP (increasing returns) / less than aP (diminishing returns)
III. and	aX	with	aY	will produce	more than aP (Increasing economy of large-scale production) / less than aP (Diminishing economy of large-scale production)

It is assumed that a is a positive quantity greater than 1.

In formula II, it will be observed, the *proportion* in which the factors are combined is not the same as in formula I, land remaining the same while labor and capital are increased by a. In formula III, however, the proportion is the same as in I, all the factors being increased in the same proportion; but the *size* of the whole combination is increased.

For the present we are concerned only with the law of diminishing returns, whose expression is:

	Acres of land		Units of labor and capital		Product	
1. If	X	with	Y	will produce	P,	
2. then	X	with	aY	will produce more than	P,	but less than aP.

This, as was shown in the earlier part of this chapter, is the condition which exists wherever men find it to their advantage to extend their cultivation to any but their best land.

Leaving out of account the increasing or decreasing economy of large-scale production, we may add the following:

Acres of land		Units of labor and capital		Product
aX	with	aY	will produce	aP;

since this reproduces the same proportion between labor and capital on the one hand and land on the other as was given in formula 1. Comparing 2 and 3, it is evident that, labor and capital remaining fixed, a variation in the land expressed by the ratio $aX : X$, will produce a variation in the product expressed by the ratio aP : a quantity greater than P but less than aP.

It appears that the product does not bear a constant ratio either to the labor and capital, *or to the land.* When the amount of land is left unchanged and the amount of labor and capital is increased, the product does not remain unchanged, nor does it increase as much as the labor and capital. And if the amount of labor and capital were to remain unchanged while the amount of land were increased, the product would neither remain unchanged, nor would it increase so much as the land. From the above formula we may therefore derive the following:

	Acres of land		Units of labor and capital		Product	
If	X	with	Y	will produce.....	P,	
IV. then	aX	with	Y	will produce more than	P,	but less than aP.

Thus the law of diminishing returns, originally applied to the product of a given amount of land under varying applications of labor and capital, is capable of being reversed and applied to the product of a given amount of labor and capital when applied to varying amounts of land. The principle is the same, and the expression similar in both cases.

But the principle can be still further extended by separating labor and capital and representing them as two factors, instead of lumping them together, as has been done thus far in the discussion. Indeed, there is every reason for so separating them, for labor and capital do not belong in the same class. They are no more alike than are labor and land, or capital and land. Moreover, if it is true that an increase in the amount of labor and capital on the same amount of land will not increase the product as much as the labor and capital are increased, it is equally true, and for the same reasons, that an increase in the amount of labor on a fixed amount of land and capital, or an increase in the amount of capital used with a fixed amount of land and labor, will not increase the product as much as the variable factor in either case is increased. The statement can therefore be enlarged by adding the following formulae to those given above:

	Acres of land		Units of labor		Units of capital	Product
V. If	X	with	Y	with	Z	will produce.....P,
VI. then	X	with	aY	with	Z	will produce more than P, but less than aP,
VII. and	X	with	Y	with	aZ	will produce more than P, but less than aP.

Formula VI is an expression of the conditions which exist when an establishment, comprising a given amount of land and capital, is operated by varying amounts of labor. If the plant is undermanned, the product may be very small in proportion to the labor employed, whereas a larger amount of labor, being able to run the plant efficiently, might produce a more than proportionally increased product. But a point is soon reached at which the plant yields its maximum *per unit of labor.* This is where every laborer is most actively employed, with the largest amount of machinery at his disposal which he is capable of handling. But the purpose of the management of such an establishment is not to get the largest product per unit of labor, but the largest product in proportion to the total cost of operation. This purpose is not fulfilled by merely working the plant at that rate which will yield the largest returns in proportion to the labor, unless the cost of labor is the only item of expense in the running of the establishment.

We must conclude, therefore, that if land were free and labor expensive, it would be most profitable to combine them in that proportion which would yield the largest product per unit of labor which would require an extensive system of farming. On the other hand, if labor were free and land expensive, the most profitable combination would be the one which would yield the largest product per unit of land which would require very intensive farming. Where both land and labor are expensive, the most profitable proportion must lie somewhere between these two extremes, depending upon the relative expensiveness of the two factors. That is to say, where land is dear and labor cheap, the tendency is toward intensive cultivation; but where labor is dear and land cheap, the tendency is, for equally good reasons, toward extensive cultivation. In the real world, where labor is always more or less expensive, land is never profitably cultivated up to that point which will force it to yield its maximum product per acre, and only in extremely new countries, where land is free, is it ever profitable to cultivate it so extensively as to yield the maximum per unit of labor.

Since so much labor is never profitably used in connection with a given amount of land as to produce the maximum *per acre*, it follows that, in any normal case, an increase in the amount of labor on such given amount of land will always increase the gross product. But since so little labor is never profitably used in connection with a given amount of land as to produce the maximum *per unit of labor*, it follows

that an increase in the amount of labor on a given amount of land will never, in any normal case, increase the product as much as the labor is increased. That is to say, except on the frontier it always pays to cultivate land beyond the point where diminishing returns begin, if it pays to cultivate it at all, but it never pays to cultivate it up to the point where an increase in the labor would yield no increase in the gross product. Similarly, since so much land is never profitably used in connection with a given amount of labor as to produce the maximum *per unit of labor*, it follows that, in any normal case, an increase in the amount of land with such given amount of labor will always increase the gross product. But since so little land is never profitably used in connection with a given amount of labor as to produce the maximum *per unit of land*, it follows that, in any normal case, an increase in the land with such given amount of labor will not increase the product as much as the land is increased. This is merely a reversed application of the law of diminishing returns as originally expounded, and it is a necessary corollary of that law. It is, moreover, the condition expressed by formula IV.

Formula VII is an expression of the law which governs any establishment or business unit which combines a fixed amount of land and labor with varying amounts of capital. By a change of terms, the explanation which was given of formula VI can be adapted to this one, since the same law applies to this as to other variations in the proportion in which the factors are combined. That is to say, an increase in the amount of capital used in any typical establishment (land and labor remaining the same) will increase the total product, but not as much as the capital is increased. On the other hand, allowing the capital to remain the same, an increase in the labor and the land will also increase the total product, but not as much as the labor and land are increased.

We are therefore driven to the conclusion that there is one law which governs the results of every variation of the proportion in which the productive factors are combined, no matter which factor is varied. It never pays to combine so little of any one factor with so much of the others as to get the largest possible product in proportion to the one, unless the others are absolutely free and do not need to be economized, in which case they pass over into the class of non-economic factors, like air and sunlight. This is equivalent to saying that, where each factor costs something, it always pays to combine them in such proportions that if any one or two of them were increased it

would increase the product, but not so much as the variable factor, or factors, were increased. In every normal case, therefore, where the factors are wisely combined, a law of diminishing returns operates with respect to each of the factors, and not with respect to one alone.

101. THE INDUSTRIAL LAW OF DIMINISHING RETURNS[1]

By F. M. TAYLOR

One of the most important applications of the general theory of combining proportions and product respects the capacity of any particular quantity of any factor, say land, to increase its output, with the aid of an increasing quantum of auxiliary factors, in response to an increasing demand. We are trying to get more product out of a given farm; what success do we have? Now, this problem is important in itself, particularly to the owner of the farm. But there is another problem, depending largely for its solution on the solution of this first problem, which is of much greater importance to people generally as distinguished from the owner of a particular farm. This second and more important problem asks, not, What success shall we have if we try to get more product from a particular piece of ground? but rather, What success shall we have if we try to get a larger product from *some particular industry*—say wheat raising—*taken as a whole?*

Taking up, now, the matter of *possibilities* for industries as wholes, and assuming general conditions to remain constant, we surely have results which, in form at least, are analogous to those already reached in our study of individual factors. Any industry, taken as a whole, if we were to try to get from it all quantities of output from a very small amount up, would be found at some time or other in each of the following conditions or stages: (1) output increasable at increasing rate or diminishing cost, (2) output increasable at constant rate or constant cost, (3) output increasable at diminishing rate or increasing cost, (4) maximum output or maximum cost, and (5) output actually diminishing. This last, of course, would never be realized, just as in our former case, because it would be foolish to expend effort in diminishing rather than increasing product. The fourth stage would be merely a point as in our preceding case, since there could be but one maximum output. The second stage, however, would not as in our original case be a mere turning-point from increasing to diminishing returns. Conditions would be constantly occurring under which

[1] Adapted from *Principles of Economics*, pp. 118–22. (Copyright by F. M. Taylor, 1911.)

the quantity producible without any material change in cost would be so considerable that, during periods sufficiently long to make the matter of much practical importance, we should be getting the necessary increases in output with only a proportional increase in expenditure.

The above paragraph has dogmatically asserted for every industry the existence of three different stages in which it might be found under a perfectly rational procedure. Let us take a moment to confirm this statement. In respect to the first stage, diminishing cost, we should expect its existence for two or three reasons. First, the moment we come to deal with industries as wholes we strike the matter of possible increase in specialization. Thus, if the amount of product which we must get from an industry is large enough, we can carry very far *geographical* specialization—raising potatoes or apples or watermelons from the lands pre-eminently adapted for raising them; and this, of course, means more than proportionally increased returns for our expenditure and, therefore, diminishing costs. A second reason for this result is to be found in the fact that calling on a given industry for an enlarged output means that increasing resort may be had to large-scale methods. We can make more use of machinery, can have greater specialization within each plant, and so on. All this means diminishing costs.

But again, it surely cannot be questioned that every industry would sooner or later get into the diminishing returns or increasing cost stage. One fundamental factor of industry, land, is absolutely limited in amount. Every single piece of it is surely subject to the instrumental law of diminishing returns, and so, of course, the total is subject to that same law. It follows that, even if all the land were equally good for the purposes of a given industry and we could afford to put all of it to the service of that industry, there would surely come a time when increased expenditure was not followed by proportionally increased reward—when increase in product meant more than proportional increase in cost. But we hardly need say that not all lands are equally good for the uses of any particular industry. Whether because of location or of qualities which could be altered only at an impossible expenditure, they differ greatly in fitness for a given purpose. In consequence land as such comes under the dominion of the law of diminishing returns (returns increasable at diminishing rate) much sooner than it would under the former hypothesis.

But, it may be asked, would not the considerations adduced above to show that we may have a condition of increasing returns prove that

we might go on indefinitely without ever reaching the state of diminishing returns? May not the advantages derivable from greater specialization or from an increased resort to large-scale methods forever save us from falling into that dread condition? The answer must surely be a negative one. There certainly is a limit to the advantages derivable from specialization and large-scale production. Every industry whatsoever, if called upon to increase its output indefinitely, would ultimately pass into a stage of diminishing efficiency or increasing cost.

But, not only would every industry, under the conditions of our experiment, inevitably be at some time or other in the condition of diminishing cost and at another in that of increasing cost, in many cases, anyhow, it would at some time or other be in the condition of substantially constant cost. This merely means that the transition from the condition of diminishing cost to that of increasing cost is not a mere point, but may extend over a considerable change in the volume of output. When we remember that, in this case of industries as wholes, we are at liberty to increase *all* the factors so long as more of the stock of each is available, the *possibility* of such a condition of constant cost seems plain enough. Land, of course, is the factor which is most likely to fail us. Yet it surely must be admitted that there are many pieces of ground of substantially the same grade of efficiency, counting location, fertility, etc.; and, until all of the best grade had been put to use, the particular industry involved would be getting out its product at unchanging cost—supposing no change in technical conditions. But the case is still clearer with industries which do not need so large a proportion of land. Just because of this fact, the number of sites which are of substantially equal efficiency for the industry in question is in excess of the need, and so production can expand without being checked by the scarcity of the only factor which is strictly limited.

We have argued that any industry, taken as a whole, *may* be in any one of the three stages as respects the relation of cost to increasing output. It should be added that these stages may alternate with one another in any order. An industry may be at one time in the condition of constant cost, then in that of diminishing cost, then in that of constant cost again, then in that of diminishing cost, and so on. More particularly, for every change there will be a period of constant cost. If the enlarged demand for copper causes marginal cost to rise to 20 cents, and if, at this marginal cost, output can be expanded, let us suppose, to any figure between 700 million pounds and 900 million;

then, for a period during which demand ranges no more widely than this, copper would be a constant-cost good.

We have seen that any industry may be in any one of three conditions: diminishing cost, constant cost, or increasing cost. But we should naturally expect, and experience confirms the expectation, that some industries would be preponderantly in the first stage, others in the second, still others in the third. Thus, it is the accepted opinion among authorities on railway transportation that this industry is preponderantly in the condition of diminishing cost or increasing returns. Again, there can be no doubt that a large number of common manufacturing industries are most of the time in a condition of constant cost. Finally, the so-called extractive industries, looked at in the long run, anyhow, are commonly viewed as in the condition of increasing cost: if we insist on using considerably larger quantities of copper, silver, cotton, wheat, etc., we shall have to consent to incur a higher cost in acquiring them.

B. Choice of Location and Enterprise

102. SPECIALIZATION AND EFFICIENCY[1]

By M. B. WAITE

Fruit growing in early days in this country was largely incidental to general farming. Orchards were planted by farmers whose main business was the growing of grains and cereals, live stock, poultry, etc. In recent years the business of fruit growing has gradually become a specialty. The work has been taken up by fruit men who are specialists in this line and who devote their entire energy to the growing of fruits. Among fruit growers there are specialists who grow only one sort or one type of fruit, as, for instance, peaches, pears, apples, grapes, small fruits, etc. The reason for this is largely the demands of intensive methods. Intensive fruit growing requires that everything shall be done for the tree or vine that it will pay to do. The object of the intensive fruit grower is to grow the greatest amount of salable commercial fruit per acre, of the best quality which can be grown with profit. To accomplish this result pruning, spraying, and cultivating must be carefully studied and practiced and the fruit after it is grown must be properly picked and packed and marketed to the best advantage. The successful fruit grower must be ready to utilize at all times the results of scientific investigations in agriculture.

[1] Adapted from *Yearbook of the Department of Agriculture*, 1904, pp. 169–70.

The successful fruit grower, in the first place, must be a good general farmer; he must understand all about teams, the use of tools, plows, and harrows, and the methods of preparing land, seeding, and cultivating. He should have some knowledge of chemistry, so as to know how to buy and mix his fertilizers and study the chemical needs of his crops. Knowledge of plant pathology and physiology is essential, and he must keep fully abreast with the latest methods of defending his plants against disease. He must also be enough of an entomologist to know every bug or insect which commonly attacks his crops. He should know fruits and fruit trees thoroughly, at least all the species which he grows; he must be familiar with the merits and defects of old varieties and be quick to discover the value of new ones. He must read everything published about his favorite fruit, and be prepared to sift the useful information from that which is not applicable to his local conditions. He must also be a good business man, in order to buy his supplies to the best advantage and market his crops with profit.

103. THE ECONOMIC CONSIDERATIONS IN CROP SELECTION[1]

By H. C. TAYLOR

What are some of the economic forces and conditions which have to be taken into account in addition to the physical and biological factors in determining what to produce in a given locality?

Opportunity for marketing the product suggests itself at once as an important item to be considered. The abundance or scarcity of labor, and the abundance or scarcity of capital, in a given locality, in comparison with other localities where the soil and climate are equally good, become important determining factors. Again, of two localities with soil and climate equally well suited to the production of a given crop, one locality may be suited also to another crop which requires the attention of the farmer at the same time of year and which is a more profitable crop.

To illustrate the way in which economic forces need be taken into account in determining which crops to grow, take, for example, the beet sugar industry. Sugar being desired, man has put forth efforts to secure a supply. The problems of securing this supply brought into requisition such plants as by nature contain sugar. Among other plants a variety of beet was found to contain sugar. The news went

[1] Adapted from *Research Bulletin 16, University of Wisconsin Agricultural Experiment Station*, pp. 93–97.

forth that the sugar supply could be secured from the beet. Every intelligent farmer asked himself the question, "Why should I not produce sugar beets?"

The physical and biological sciences were at once brought to bear upon this problem to ascertain the soil and climatic conditions which are best suited to the growth of the sugar beet. Geology, meteorology, physics, chemistry, entomology, plant physiology, plant breeding, bacteriology, etc., made their contribution to the farmer's knowledge of the regions in which beets thrive, the varieties of beets containing the highest percentage of sugar, the methods of cultivation which will best adjust the soil to plant growth, the methods of protecting the plant from vegetable and animal parasites, etc. Tables were published showing the percentage of sugar found in the beets from different seeds on the same soil, and from the same kinds of seeds on different soils and under different climatic conditions. Maps were made showing the regions where the climate was suitable for sugar beet culture. Soils were surveyed with a view to finding the land best suited to the sugar beet.

With this knowledge, which appeared all-sufficient to the minds of many experiment station men, beet culture was advocated without asking the question, "Where is the beet sugar industry likely to prove profitable?"

The profitable introduction of the sugar beet in any given locality where soil and climate are suitable depends upon the relative profitableness of this crop when compared with other crops occupying the same place in the rotation and requiring the attention of the farmer at the same time of year. For example, in the sugar beet regions of Germany, Indian corn does not thrive, and in the absence of competing crops which are very profitable, beets stand a better chance (other things being the same) than in the corn belt of the United States, where corn is a very profitable competitor of beets. In those parts of Germany where the beet sugar industry prospers, beets have only to prove as profitable as potatoes, root crops grown for fodder, or a bare fallow, in order to find a profitable place in the field system, whereas in the corn belt of the United States beets must prove as profitable as corn or give place to it.

The relative profitableness of corn and sugar beets can be ascertained by a system of records which will show all the elements of costs and receipts of the two crops and their influence upon the profitableness of the other enterprises of the farm. In the consideration of the

relative profitableness of corn and beets, account must be taken of the difference in the acreage of each crop a farmer can manage. It is well known that a farmer can grow more acres of corn than of beets. It is a mistake therefore to compare profits per acre and to stop there. Profit per acre must be multiplied by the number of acres the farmer can handle. Furthermore, the way in which the corn or the beets complement the other crops with respect to utilization of labor and equipment should be considered. It is always desirable to have an even and continuous demand for man and horse labor. It is also important to consider the profitableness of the other enterprises, such as dairying, cattle feeding, or hog feeding, which may be based upon the corn crop.

Some crops can be grown over a wide area. Others are more limited in area because of climatic and soil conditions. Where the areas of two crops that hold the same place in a rotation and require labor at the same time of year overlap, the crop with the more limited area will be the strongest competitor for the use of the land especially suited to its production. And the tendency is for the crop with the wider area to be grown on land not required for the crop with the limited area.

This point can be made clear by reference to a concrete example. A piece of land in France, said to be as fine land as exists in the world for wheat production, is suited also to the production of grapes that make a brand of wine very highly prized. The areas suited to the production of this brand of wine are very limited, but the areas suited to wheat production are abundant. To exclude wheat from the wine land affects the supply of wheat but little, but to exclude the vine from any appreciable portion of the limited area suited to its culture for the manufacture of this special brand of wine would materially reduce the supply and result in a rising price, which would give the vine a greater power in competing for the use of the land.

It happens that, while corn has more extended uses and more exclusive uses than sugar beets, the world has a much greater area physically suited to beet culture than to corn culture. It is hardly probable, therefore, that the sugar beet will ever be able to compete with corn on even terms in the corn belt of the United States.

Wages and interest vary directly with the opportunity for the profitable employment of labor and capital and inversely with the supply of these factors. This is another economic law which has received too little attention in the promotion of the sugar beet industry

in the United States, where opportunities for productive labor are abundant and labor and capital scarce in comparison with our European competitors.

Other conditions being equally favorable, a country in which laborers and equipments are relatively scarce cannot successfully compete in the production of crops requiring relatively large applications of labor and capital, unless the product be a perishable one which will not stand long shipments, or one with a very low specific value on which the freight would be very high per dollar's worth of product. High wages put the sugar beet industry at a disadvantage in the United States and this fact points to the wisdom of our producing the other crops which require less labor than beets or in the growing of which European labor is not generally in competition.

While the beet sugar industry lends itself well to illustrating the necessity of studying economic forces as well as the physical and biological forces with which the farmer has to deal in order that a practical conclusion may be drawn, this necessity exists in every line of production. Tobacco, alfalfa, wheat, barley, oats, corn, cotton, potatoes, beans, grapes, apples, peaches, oranges, lemons, dairy products, beef, pork, mutton, wool, and all other agricultural products have to be produced where the physical environment is suitable, but within these limits conditions with respect to labor, capital, markets, relative profitableness of competing crops or live stock become prime factors in determining what to produce in a given place. Silk and tea can be produced in the United States, but on account of the difference in labor conditions here and in the competing countries of the Orient, these products can be imported more cheaply than they can be produced at home.

104. DETERMINING THE ADAPTABILITY OF ENTERPRISES[1]

By W. J. SPILLMAN

One of the most important factors in determining profit in farming is the adaptability of enterprises to soil and climatic conditions, and especially to existing economic conditions. Adaptability to soil and climatic conditions is so obvious as to need only mention here, but the facts regarding adaptability to economic conditions are not so well understood.

The accompanying table gives an estimate of the average labor income for one of the leading dairy counties in the state of Wisconsin

[1] Adapted from *Yearbook of the Department of Agriculture*, 1913, pp. 101–5.

and one of the leading dairy counties in the state of Massachusetts. The calculations are based on census figures in so far as these are available. Unfortunately, certain items necessary to our purpose are missing. But the value of the figures as a comparison between different regions is not destroyed, for the same defects inhere in the estimates for the two regions.

ESTIMATE OF THE AVERAGE LABOR INCOMES FOR FARMS IN A LEADING DAIRY COUNTY IN WISCONSIN AND ONE IN MASSACHUSETTS

Items of Comparison	Selected County in	
	Wisconsin	Massachusetts
Number of farms	3,356	5,436
Improved land per farm, acres	65.0	34.2
Number of cows per farm	12.7	5.02
Improved land per cow, acres	5.38	4.80
Total farm investment	$10,300	$7,945
Value of farm buildings	2,279	3,282
Value of implements and machinery	368	405
Dairy products, per cow	42	106
VALUE OF PRODUCTS		
Dairy products (exclusive of home-used milk and cream)	$505	$532
Wool and mohair	1	0
Poultry products	124	183
Domestic animals sold	318	175
Domestic animals slaughtered	42	20
Value of crops not fed	576	885
Total	$1,566	$1,795
EXPENSES		
Labor	$146	$527
Fertilizers	1	74
Feed	44	396
Maintenance of buildings, 4.5 per cent	102	148
Maintenance of implements, etc., 20 per cent	74	81
Taxes, 0.6 per cent	62	48
Total (designated expenses)	$429	$1,274
Miscellaneous expenses	64	191
Total (all expenses)	$493	$1,465
Farm income*	$1,073	$330
Interest on investment, 5 per cent	575	397
Labor income*	558	−67

*Should be increased by the value of home-used milk and cream and receipts from outside sources. Should be decreased by the amount paid for live stock purchased.

It is seen that in the Wisconsin county the average labor income, as above determined, is $558 per annum and the average farm income is $1,073 per annum. In the Massachusetts county the average labor income is minus $67. In other words, the average farm income is $67 less than 5 per cent interest on the average investment per farm. The reasons for this difference are seen in the data given in the table. In the first place, the western farms are twice as large as the eastern farms, but the average investment in farm buildings is nearly 50 per cent larger on the eastern farms. The investment in farm machinery is also considerably larger on the small farms of the East. In the matter of gross income the eastern farms have distinctly the advantage. Although the average number of cows per farm in the Massachusetts county is less than half of what it is in the Wisconsin county and the income per cow is $2\frac{1}{2}$ times as much, the great difference in expenses in the two counties more than counterbalances this increased income. The Massachusetts county has on the average a higher income per farm from dairy products. It also has a 50 per cent greater income from crops. The trouble lies in the higher expense of farming in the East. The labor bill on the Massachusetts farm is $527 annually, while on the Wisconsin farm it is only $146. The Massachusetts farmer's children have gone to the city and he must hire his labor; the Wisconsin farmer's family does most of the labor. The farmer in the Massachusetts county spends an average of $74 a year for fertilizers, the one in Wisconsin about $1 annually. The Massachusetts farmer buys practically all his concentrated feed and perhaps some roughage; the Wisconsin farmer raises most of the feed on his own farm, his farm being large enough to justify this course. The total expenses of the average farm in the Massachusetts county are nearly a thousand dollars greater than in the Wisconsin county, while the total income is only about $200 greater.

In order that farming in this Massachusetts county shall be as profitable as in the Wisconsin county, it is necessary, on account of the very much higher expense of farming in the East as compared with the West, that the farm business be based largely on enterprises which have a distinct economic advantage over similar enterprises in the West. It is not yet possible to state in full just what these enterprises are, but some illustrations can be given. The production of hay in the New England states is less than sufficient to supply the local demand. A considerable proportion of the supply must, therefore, come from the Middle West. As hay is a cheap, bulky product, transportation

charges on this commodity are relatively high. This gives the eastern farmer a much higher price than his western competitor. Hay production, therefore, appears to be one of the enterprises which possess marked economic advantages in New England. The production of vegetables is another enterprise which enjoys marked economic advantages when conducted in the immediate vicinity of the consumer. This, then, also appears to be an enterprise which should be developed in New England to as full an extent as economic conditions justify.

Those who are most familiar with conditions of production and marketing in New England are of the opinion that the larger cities of that section are supplied with home-grown vegetable products during the summer months in a quantity approximately equal to the demand, but there are many smaller towns and cities, as well as considerable areas of farming community, in which this supply is inadequate. There is room, therefore, for considerable extension of vegetable farming through a large part of this territory.

It is undoubtedly true that if the system of distribution of perishable farm products were so perfected as to render it possible to supply all communities at all times of the year with perishable farm products in such quantity as they would use, there would be a very considerable increase in the consumption of this class of farm produce. In view of the competition with the Middle West, where the production of ordinary farm crops and live stock is much less expensive than in New England, such organization for the distribution of perishable farm produce is of prime importance in this region as a means of increasing the possibilities of production of a class of products to which the region is eminently adapted and for which it possesses important economic advantages in nearness to the consumer and in the fresh condition in which products of this class could be laid before the consumer.

Fruit growing appears to be another industry which might well be developed to much larger proportions in New England. Not all of the region is adapted to this industry, but there are localities here and there which can produce various kinds of fruits to advantage. On account of the nearness to market and the considerable expense of shipping fruit long distances, the New England producer, having an unlimited market near at hand, ought to be able to make a profit from this industry.

In the case of dairy products, prices are based quite generally on the butter value of milk. Because butter can be shipped at very

small cost from the Middle West to eastern cities, the prices of dairy products in the East and West are not greatly different; but the cost of production, as we have seen, differs very materially. If the dairy industry is to survive in New England it is therefore necessary that it should be confined to those phases of dairying in which the price of the product is not necessarily based on the butter value of the milk. Not only that, but dealers and the public generally must recognize the necessity for paying higher prices for milk in eastern cities. The fact that dairy cows give some occupation during the long winter season in New England is a mitigating circumstance and is one of the reasons why dairying persists under such disadvantageous conditions. Even if the farmer does not earn ordinary wages for the work he does in his dairy in the winter, it is frequently the case that the time thus employed would otherwise be largely wasted, so that any profit he makes over the actual expenditures in conducting this business is so much added to the annual income. The fact remains, however, that economic conditions in New England are unfavorable to the dairy industry. Many other illustrations could be given of economic advantages enjoyed by certain enterprises in particular localities, but this is sufficient to show the importance of the subject.

C. Economical Combinations of the Factors

105. HOW MUCH LAND?[1]

By M. B. WAITE

The usual aim of the fruit grower as well as the farmer is to produce large quantities of salable produce with the least amount of labor and invested capital. In many cases, especially in opening up new countries, extensive methods were probably the most profitable at the outset. In extensive farming, nature is depended on to do the greater part; man does comparatively little. In intensive methods, the opposite is attempted; nature is assisted in every possible way and encouraged to do her utmost, the aim being the production of the largest quantities and of the finest quality per acre. As year after year the country becomes more thickly settled, land becomes scarcer and more valuable, and intensive methods must gain prominence. Even now we hear certain individuals criticized for attempting to farm too much land—more than they can handle profitably.

[1] Adapted from *Yearbook of the Department of Agriculture*, 1904, pp. 172–73.

There is a good lesson in the story of the Pennsylvania farmer with a 400-acre farm who, after selling off 100 acres, found, by giving a little better attention to the remaining 300 acres, that his sales were in no wise diminished; later, after selling off 200 acres more, and concentrating all his energies on his remaining 100-acre farm, he made it produce as much as did the original 400 acres. The writer knows of a number of instances where 100-acre farms devoted to fruit culture far exceed in production other fruit farms of 400 acres advantageously situated. Under such intensive methods, the original fertility of the soil is not so important a factor as are convenient markets, adaptability to special crops, and other favorable conditions.

106. FACTORS DETERMINING THE SIZE OF THE FARM[1]

By W. J. SPILLMAN

The farms in the Atlantic Coast states were established at a time when the family farm was necessarily small because of the lack of labor-saving implements. The owners of these small farms produced nearly everything they needed in the way of food and clothing. They naturally produced a very small surplus, which went to feed the cities. Under these conditions only a small proportion of the population could live in cities, because the surplus of farm products over and above the needs of farm families was so small. But about the time when immigration began to flow over the Alleghany Mountains and spread out in the broad Mississippi Valley, covering one of the most extensive and most fertile agricultural regions in the world, improved farm machinery began to be invented. This permitted a farm family to farm a much larger area of land.

The effect of this migration into the Mississippi Valley and the development of more efficient farming with labor-saving implements was overwhelming on the small farms of the Atlantic Coast. The period between 1840 and 1850 witnessed the most tremendous revolution in agriculture in the Atlantic Coast states that has ever occurred in this country. A small hint of the disaster which overtook eastern farmers during that decade is seen in the following facts: In Chester County, Pennsylvania, which at that time was one of the leading agricultural counties of the country—and which still maintains preeminence as a farming region—the number of swine fell from 65,000 in 1840 to 36,000 in 1850. These small Chester County farms, on

[1] Adapted from *The Annals*, May, 1915, pp. 69–70.

which it was not practicable to use the more modern methods of crop production, found themselves poorly prepared to compete in swine production with the large farms of the West. The disaster to the sheep industry was much more marked, the numbers having fallen during the decade from 56,000 to 13,000. At the beginning of this decade the production of beef was perhaps the most important phase of agriculture in Chester County. In the beginning of the decade there were 39,000 beef cattle in the county. Competition with the West reduced this number rapidly, and the reduction continued until 1890, when only 11,000 head of these cattle remained in the county. Practically the only live-stock industry left to these farmers was dairying, and it is a bitter pill to the stockmen whose business has been based upon beef cattle, swine, and sheep to descend to the continuous and laborious work of caring for dairy cows and their products. In 1840 there were 16,000 dairy cows in Chester County, Pennsylvania; in 1890 there were 49,000, and dairy products now constitute by far the most important source of income in the county. The small farms in the region could be converted into modern family farms only by some such intensive type of farming as dairying, as they are not adapted to fruit and vegetables.

What has been said above applies practically to the whole North Atlantic Coast. Small farms still predominate in that region, but the reasons are at least partly historical, and not wholly economic. In the West, which was settled up after labor-saving machinery had been generally introduced, these small farms are few in number and are gradually disappearing to make place for the more effective large farm. In general, farm management investigations have demonstrated that the smallest effective area for a farm is that which will give constant employment at productive labor to the average farm family. It may be any amount larger than this, provided the farmer himself is capable of managing to advantage a larger amount of labor.

107. APPORTIONING THE FACTORS OF PRODUCTION[1]

By E. DAVENPORT

We are just emerging from a pioneer agriculture, in which land had little value, because it was abundant, and labor was the principal element in the cost of production. If the American farmer has been

[1] Adapted from *Circular No. 177, Agricultural Experiment Station, University of Illinois*, pp. 3–8.

wasteful of fertility it is because he has had it to waste, but he has been exceedingly economical of labor, which was costly, and has produced the cheapest food the world has ever eaten, or ever will eat, though the yields per acre have been little more than half those of older countries. Our question has been not how much *per acre* but how much *per man*, and in this the American farmer has been right even though his average yields have been low.

We are, however, approaching old-country conditions. Land is growing scarce, and therefore costly, so that elements other than labor have begun to enter into the cost of production and food is *necessarily higher*.

Under pioneer conditions the highest yields have been the most profitable, because they were the result, not of expensive methods of farming, but of especially rich spots of land or of favorable seasons, costing nothing extra beyond the increased expense of harvesting. It is still true that high yields are profitable *if they can be cheaply produced, but the general principle is that the higher the yield the greater the cost, not only per acre, but per bushel.*

This natural operation of the economic law of diminishing returns in farming is best illustrated by an experiment begun many years ago by Lawes and Gilbert at Rothamsted, England, the oldest experiment station in the world. They applied, every year for twelve years, different amounts of complete fertilizer to adjoining fields of wheat, with the following results:

Fertilizer Applied	Average Twelve Years	Increase	Increase per 200 lbs.
None.....	18.4 bu.		
200 lbs....	28.4 bu.	10.0 bu.	10.0 bu.
400 lbs....	36.4 bu.	18.0 bu.	8.0 bu.
600 lbs....	38.0 bu.	19.6 bu.	1.6 bu.

By this we see (fourth column) that as an average of the twelve years the first 200 pounds of fertilizer returned 10 bushels, but that a second 200 pounds increased the yield only 8 bushels above the first, and that a third 200 pounds returned but a little over a bushel and a half above the double dose, showing that increased outlay is not always followed by correspondingly increased yields.

The experiment was continued, and at the end of fifty-two years the results were as follows:

Fertilizer Applied	Average Fifty-two Years	Increase	Increase per 200 lbs.
None.....	14.8 bu.		
200 lbs....	23.9 bu.	9.1 bu.	9.1 bu.
400 lbs....	32.8 bu.	18.0 bu.	8.9 bu.
600 lbs....	37.1 bu.	22.3 bu.	4.3 bu.

These figures for half a century show the same principle of diminishing returns in a modified form. Owing to soil exhaustion, the yields from the unfertilized land decreased during the fifty-two years. On account of a few bad seasons, the average effect of the first dose (200 pounds) was slightly decreased. Owing to the accumulation of residues of fertilizer, the effects of the second and third doses were relatively larger than for the twelve-year period, though subject to the same law of diminishing returns. That is to say, the last dose of fertilizer was less than half as effective as the first; or, what is the same thing, the last increment of increase cost more than twice as much per bushel as the first.

In the more intensified agriculture that is just ahead of us the question is, therefore, not how much the farmer can produce per acre, but how much he can *afford* to produce. His yield must depend, not mainly upon his knowledge of production, but *upon the price of the product.*

For example, in the tables quoted, each 200 pounds of fertilizer cost $7.50. With wheat at a dollar a bushel, a little computation will show that both the single and the double applications would pay, but that the triple application would swallow all the profits and more. At eighty cents a bushel, none of the treatments would pay, and both the farmer and the public would have to be contented with the lower yields from untreated land until such time as the consumer was willing to pay a higher price for his food. In this way is yield dependent upon price, and it is the natural way in which supply adjusts itself to demand as expressed in price.

Of the same tenor is the experience of the University, which is producing corn yields varying from 26 bushels per acre on continuously unfertilized land to an average of 93 and a maximum of 120 bushels per acre on land which is excessively fertilized. It is making no money on either extreme: in the one, because the yield is not sufficient

to pay the labor; in the other, because the fertilizers are so costly as to swallow all the profits. The problem of the farmer, therefore, is to determine at what point between these extreme yields he must aim to fix his average yield, and in determining this point he must take into consideration the value of his land, the cost of labor, the cost of fertilizer, and the probable price he will receive for his product.

From this we see the impossibility of "doubling yields without increased expense," and also that when prices drop the income of even the best farmers must decline, for extreme yields are profitable only with high prices. It must be clear that we cannot recklessly increase the yield per acre.

On the other hand, we cannot continue the old-time wasteful methods of soil exhaustion, cheap and effective though they were in their day, because they are resulting in decreasing yields in the face of increasing demands. If our declining yields due to soil exhaustion are to be arrested and turned into even a slight increase to meet the growing demands, it is clear that new methods must be employed, but the object must be a moderate increase in yield by economic methods, and not extreme yields, which are bound to result in loss to the farmer or in prohibitive prices for food or both.

Our farming is now in a transition stage between the "extensive agriculture" of the pioneer, in which fertility is disregarded and there is no investment but labor, and the "intensive agriculture" of old and densely populated countries, in which the main question is yield per acre, resulting either in high cost of food or in poorly paid labor. (China produces the most per acre but pays its laborers the least.)

Our present yields are below what the climate and the general situation ought to produce, owing mainly to certain adverse conditions that can be cheaply and easily corrected, and money put into this channel will well repay the investment because it will increase the yield without being subject to the law of diminishing returns. This is where our present duty and opportunity lie in establishing the foundations of a permanent agriculture. It must be remembered that we have not yet reached the intensive stage, where it will pay either the producer or the consumer to attempt maximum yields on American land.

In the transitional stage, in which our yields are kept down by certain adverse conditions, the first step in a rational procedure is the correction of these conditions by relatively inexpensive methods, such as the use of lime to correct acidity, the application of cheap forms of

phosphorus or of potassium to balance fertility, keeping nitrogen always the limiting element, a better adjustment of crops to soil and to locality, and the organization of more economic systems of farming, with special attention to live stock, the distribution of labor, and the investment of capital. All the advice given out by the University of Illinois at this juncture is based upon this principle, because investments of this character, whether of labor or of capital, are certain to increase the yield with relatively slight expense. Having done what we can in this way, we may await with confidence the intensive stage, the coming of which will be characterized by a permanent rise in prices.

The greatest hazard in farming is the season, against which improved methods are only a partial protection. The farmer with little or no capital must confine himself to practices that will pay every year, while the man with considerable means is free to follow those more expensive methods which pay best in the long run, even though an adverse season now and then might show a loss. This lack of capital cannot be remedied by short-time loans to the small farmer, nor by loans of any kind to the farmer whose yields are limited by bad cultivation or to the one incapable of managing his business upon the more complex and, to him, more dangerous basis that will be at once established when he attempts to increase his yield by a larger use of capital.

It is commonly said that not enough floating capital is invested upon American farms, and it is doubtless true, but it must be remembered, both in extending credit and in making loans, that the American farmer has had little experience in handling capital. Manifestly, therefore, when he borrows, both he and the lender must be satisfied that the loan will be judiciously used, or it may result disastrously.

The student of agriculture cannot fail to see the danger of overcapitalization in attempts to secure abnormally high yields, a danger which increases as the practice spreads, for although one man may safely increase his yields without depressing the price, if all farmers were to follow his example the price would drop and all would lose money. Under this principle a few farmers will always be practicing methods not practicable for the mass.

This circular is issued, not as an argument for poor farming nor for the continuance of old-time methods, but to point out that we are not to step at once and blindly into expensive forms of intensive agriculture. We should ascertain and practice those relatively inex-

pensive methods belonging to a transition stage that correct bad conditions and thereby considerably increase the yield without seriously raising the price, so that the results may be profitable alike to the farmer and to the public whom he serves.

D. Large- vs. Small-Scale Production

108. THE PASSING OF THE BIG FARM

a) THE BREAK-UP OF THE PLANTATION[1]

In all of the five geographic divisions, with the exception of the North Central, the increase since 1850 in the number of farms has been relatively greater than that in farm area, and consequently the average size of farms, with the exception above noted, has decreased during the same period. In the accompanying table the average size of farms is given by geographic divisions for each census year, beginning with 1850.

TABLE III

AVERAGE NUMBER OF ACRES PER FARM, BY GEOGRAPHIC DIVISIONS: SUMMARY 1850–1900

Geographic Division	1900	1890	1880	1870	1860	1850
The United States..	146.6	136.5	133.7	153.3	199.2	202.6
North Atlantic.....	96.5	95.3	97.7	104.3	108.1	112.6
South Atlantic.....	108.4	133.6	157.4	241.1	352.8	376.4
North Central.....	144.5	133.4	121.9	123.7	139.7	143.3
South Central.....	155.4	144.0	150.6	194.4	321.3	291.0
Western.....	386.1	324.1	312.9	336.4	366.9	694.9

An examination of the average size of farms for the individual states and that for the counties discloses in many of the older settled communities a decrease in the average size of farms. This is most marked in the cotton-growing states, where it is the result of subdivision of the larger holdings and the leasing of smaller areas to tenants, the size depending upon the amount of land which the tenant can properly cultivate by his own labor. This movement began shortly after the close of the Civil War, and is still in progress in most sections where large areas are devoted to the growing of cotton. Its extent may be measured by the reduction in the average area of

[1] Adapted from *Twelfth Census of the United States*, 1900, Vol. V, p. xxi.

farms in the South Atlantic states from 376.4 acres in 1850 to 108.4 acres in 1900.

Throughout the United States, the increase or decrease in the average size of farms, therefore, is due to the changes incident to the adjustment of the agricultural operations of each locality to those branches of husbandry to which it is best adapted. It may be said that the average area of farms tends to approximate the area from which the farmer possessing average capital can secure the largest returns.

b) THE FAILURE OF "BONANZA" FARMING[1]

By HENRY F. BLANCHARD

The first grain producers of California attempted to crop as large an acreage as possible at a minimum cost. In order to do this, at that time all that was necessary was very shallow plowing (3 or 4 inches in depth), broadcasting the seed and harrowing it into the soil. This was continued from year to year and fairly good crops were produced for a while. In the pioneer days the interior valleys were not considered of much value for the production of crops on account of the small amount of rainfall. At that time certain companies were enabled to secure large tracts of this land at a nominal price. These companies discovered that this land would produce good yields of grain and it was cropped on a very large scale. Since that time there has been a gradual breaking up of these large farms into smaller ones. However, there are still too many large ones; until the farms are so reduced in size that they may be properly handled we may look for continued low production and further depletion in the soil fertility of the wheat lands.

NOTE.—We are all familiar, too, with the fact that the enormous wheat farms which were so striking a feature of the early days of one-crop wheat farming in the Red River Valley of Dakota have had to give way to the more moderate-sized and more diversified farms which apparently are to characterize our permanent type of agriculture. This cutting up of the great grain farms, and the mammoth cattle ranches as well, is reflected in the following figures of the census of 1910: "In the West there was a decrease in the average size of farms from 694.9 acres in 1850 to 312.9 acres in 1880. This was followed

[1] Adapted from *Bulletin 178, Bureau of Plant Industry, United States Department of Agriculture*, pp. 8–11.

by a gradual increase during the next twenty years, but between 1900 and 1910 the average size of farms decreased from 386.1 acres to 296.9 acres."[1]—EDITOR.

109. THE LITTLE FARM WELL TILLED[2]

BY BOLTON HALL

A new boom is on, the farm land boom; a new development is beginning, intensive agriculture; a new discovery, the riches of the soil; a new opening, the intelligent use of "the little lands." It does not demand any more brains than any of the other opportunities and it is open to a far larger number. "The profit of the earth is for all."

A few acres is enough, with modern methods and active minds. A. R. Sennett, in a recent publication, shows that it requires at least two acres of farm land, as at present cultivated, to feed each one of the people of America with grain and vegetable products. Again, he estimates that it requires at least an additional acre of pasture land on which to raise our beef or animal food; or three acres to feed each person. These estimates are based on the present ordinary wasteful methods of culture and pasturage.

One irrigated acre has for thirty years given Samuel Cleeks, of Orland, Glenn County, California, a larger net income than many of his neighbors get from hundreds of acres apiece. Mr. Cleeks saves an average of four hundred dollars per year after getting a good living from his acre, while many are becoming poor trying to run big farms without irrigation.

In the Eastern and Middle states are chances to do just as well on a single acre. Oliver R. Shearer, of Hyde Park, Pennsylvania, makes $1,200 to $1,500 a year on $3\frac{1}{3}$ acres, of which he cultivates $2\frac{1}{2}$ acres. He has raised and educated three children and paid $3,800 for his property out of the profits of his intensive farming. D. L. Hartman, of New Cumberland, Pennsylvania, in 1905 got $454 from an acre of early tomatoes and an equal amount from an acre and a half of late tomatoes. An acre and a half of strawberries brought him $555 and his early cabbages averaged about $300 per acre. He says that no one can fix the limit of value one acre can produce.

[1] Thirteenth Census of the United States, Vol. V, p. 62.

[2] Adapted from *A Little Land and a Living*, pp. 77–78, 109–12, 271, 285. (Copyright by Bolton Hall. Published by the Arcadia Press.)

One-sixth of an acre planted to radishes and lettuce, followed by eggplant and cauliflower, and the next year to radishes alone, followed by eggplant, brought over $200 each year; at the rate of over $1,200 an acre. Again, $86.78 was received from one thirty-second of an acre, at the rate of $2,780 per acre. This amount could have been raised to $4,000 an acre; all without using glass.

"In my judgment, working early and late to raise more corn to feed more hogs, in order to buy more land, is not farming but speculation. The great fault of American agriculture is too much land." That condition is passing away, and the farmer is learning that the small farm near the town is the money-maker. The time is at hand when the principles we are laying down in this book for specialties will be applied to the great staples, and we shall be able to double and redouble our yields.

The most important thing to teach today is how to make the greatest profit from the least land. When the farmer has learned that, he will have no cause to fear the absorption of farms into large holdings. The value of the farm lies chiefly in the farmer, so that a very small tract by intensive cultivation will give a good living and provide for old age. Even two acres will do this and more than this.

110. THE SIZE OF FARMS AS RELATED TO PROFITS[1]

By G. F. WARREN and K. C. LIVERMORE

Many persons who are not engaged in farming, and some farmers, believe that smaller farms better tilled will bring greater profits. All the figures that we have secured in this county, as well as figures secured from five townships in Livingston County, show that the larger farms are much more prosperous. The fact that there are not nearly so many farms as formerly shows the change in farming to meet the conditions that call for larger farms. The fundamental cause of this change is the change from hand labor to the use of machinery. And since more and more machinery is being used, it is to be expected that farms will continue to increase in size for some time.

This does not mean that large "bonanza" farms are to develop. The group of largest farms averages only 261 acres. All the farms are the typical American "family-farm," on which the farmer and his

[1] Adapted from "An Agricultural Survey of Tompkins County, New York," *Bulletin 295, Cornell Experiment Station*, pp. 415–17.

family do the major part of the farm work. Even on the farms containing over 200 acres the family does half of the farm work. These figures may, therefore, be taken as suggesting the most profitable size for a family-farm. The larger farms seem to be better than the smaller ones for this purpose.

These figures do not throw any light on the desirability of the very large farm, on which the farmer is so busy managing that he does not do any manual labor. From observation the writers are of the opinion that such farms have many serious obstacles in their way. They are not likely to be able to handle labor effectively. The farmer who works with his men and directs them as he works, and who treats his hired men as equals, has a great advantage.

There can be no question but that the larger farms are paying better. But some persons may say that the difference is due, not to the size of the farm, but to the farmer, and that the better farmers live on the larger farms. If small farms are the best size, it would seem as if the more intelligent farmers would choose them. If the more intelligent men all choose large farms, there must be some reason for it. Certainly there must be some good farmers living on small farms. If the small farm offers the best opportunities, these farmers should be doing exceedingly well.

TABLE XXVIII

VARIATION IN PROFITS WITH DIFFERENT SIZES OF FARMS; 586 FARMS OPERATED BY OWNERS

ACRES	PERCENTAGE OF FARMS OF EACH SIZE MAKING LABOR INCOMES AS DESIGNATED								
	—$200 or less	—$199 to 0	$1 to $200	$201 to $400	$401 to $600	$601 to $800	$801 to $1,000	$1,001 to $1,500	Over $1,500
	Per-centage	Per-centage	Per-centage	Per-centage	Per-centage	Per-centage	Per-centage	Per-centage	Per-centage
30 or less.....	7	10	40	33	10	0	0	0	0
31–60.....	2	11	33	29	16	7	1	1	0
61–100.....	2	11	23	23	20	13	4	2	2
101–150.....	5	11	15	22	20	9	6	8	4
151–200.....	2	5	14	21	19	4	7	16	12
Over 200.....	6	3	14	6	15	12	12	12	20

Of 138 farmers on farms of less than 61 acres, only 10 made a labor income as high as $600. Of 234 farmers with over 100 acres, 79 made over $600.

Of 138 farmers on farms of less than 61 acres, only one man made a labor income of $1,000. Of 34 farmers on farms of over 200 acres, 11 made over $1,000 labor income.

Small farms have many disadvantages. A large part of the farm work cannot be done economically without at least two men. But many of the smaller farms do not have enough work to keep a hired man fully employed. The cost of labor is excessive on small farms, also the cost of horse labor. The cost of producing crops on the small farms is also increased because of the lack of machinery. If a farmer is able to manage horses and machinery to good advantage it may pay him to go in debt for additional land.

Sometimes it is very difficult to purchase land that adjoins one's farm. The line fence is one of the greatest obstacles in the way of eastern agriculture. The farms are not well laid out, and it is often impossible to purchase so as to make a farm of satisfactory area and shape. It will sometimes pay to sell and buy where a satisfactory area can be secured.

Many owners have enlarged their acreage by renting additional land. Of the owners for whom a labor income was calculated, 14 per cent also rented land. This, together with the consolidation of farms by purchase, shows how many men recognize the importance of increased acreage. Eighty-six farmers who rented additional land owned an average of 89 acres and rented an average of 51 acres. This gave them 35 acres more than the area operated by the average owner who did not rent. Their average labor income was $522, which is $115 more than the amount made by the average owner who did not rent. For general farming these figures show that a farm should contain at least 150 acres.[1] The upper limit of area is determined chiefly by the layout. With ideal conditions, with the buildings in the center of the farm, and with a public road running past the buildings, as high as 600 acres may be run from one center. With more than this area the distance of the fields from the buildings is usually too great. It is not often that one can secure so large an area well located with respect to buildings. The most profitable general farms in Tompkins and Livingston counties contain about 200 to 300 acres of good land.[2]

[1] Other studies have shown the same result. See especially *Bulletin 41, United States Department of Agriculture.*

[2] The remainder of this reading is from *Bulletin 349* of the same station, pp. 677–68. By G. F. Warren.

The above discussion applies to general farming and dairy farming, but, whatever the type of farming, the farm should be large enough to allow for the use of the well-established labor-saving practices, and large enough to provide a variety of products that make a full year's work. For truck growing, 80 acres may be as large as 300 acres in general farming. An acre partly covered with greenhouses may be an equally large business.

There is much discussion of this subject by persons who have had no farm experience or whose farm experience was gained before manure-spreaders, potato-diggers, and hay-loaders were invented. These persons usually advise little farms rather than 150- to 200-acre farms. The advice is also constantly given that farmers turn to truck growing. The supply of truck crops is easily overdone. It is usually unwise to grow truck crops unless both the soil and the markets are particularly adapted to such crops. The vast majority of our farmers must continue to produce wheat, milk, hay, oats, potatoes, and the general farm crops. Such advice is usually given under the impression that small farms and truck crops will reduce the cost of living in cities. Under American conditions, the full-sized farms produce farm products at least cost, so that the little farm is not desirable from any standpoint. Farmers are quick to respond whenever any type of farming promises greater profits. They change to truck growing whenever conditions warrant the change.

A farm of 1 to 20 acres makes an excellent home if one has some other source of income, but a general farm of this area is very poor business. A farm is a place to work. The man who buys a farm buys a permanent job. If the farm is not large enough to provide a fair amount of productive work, it must of necessity be a very poor business.

E. Some Problems of the Farm Manager

III. THE FARM LAYOUT[1]

By W. M. HAYS[2]

Spend some time in devising a suitable plan for the arrangement of buildings, fields, fences, etc., on the farm, and estimate the necessary cost of installing it in order to save useless expense in travel to and

[1] Adapted from *Bulletin 236, Bureau of Plant Industry, United States Department of Agriculture*, pp. 10–13, 34.

[2] Andrew Boss, A. D. Wilson, and Thomas P. Cooper, co-authors.

from fields, in working awkwardly shaped fields, and in poorly arranged farmsteads, and in unnecessary fencing. Plan the farm before developing the farmstead, when this is practicable.

Locate the farmstead of the family-sized farm on the highway, near the center of one side rather than at the corner or in the center of the farm, thus avoiding social isolation from being distant from some fields by being at the corner. Thus secure the advantages of being on the highway, where more people will call, of having fields easily accessible on three sides of the farmstead for small pastures, and of having short lanes which give easy access to all fields. Arrange

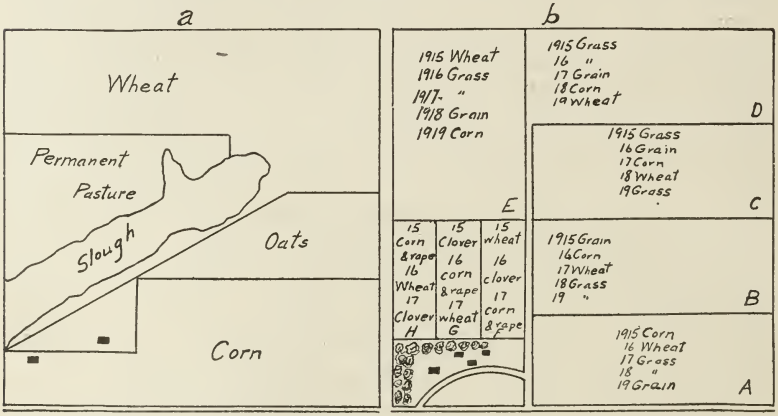


FIG. 9

so that one corner of each field is as near the farmstead as may be, that men and teams may be quickly at work upon leaving the farmstead, and that time may be saved in getting stock to and from the fields for pasture, and also to avoid waste of land and fencing in long lanes.

In planning the fields, take into consideration the fact that the nearly square field requires less fencing. On the other hand, that the longer the field the more easily the team work is done, and in deciding consider the number of horses used in the fields and the kinds of crops grown. For example, if a field is to be in pasture most of the time, the more nearly square form may be used, while if often plowed and cultivated there is reason for the longer form of field.

The change needed on most farms in a new country is to avoid growing grain and cultivated crops continuously on one part of the farm and hay and pasture on another part. Alternating these three

classes of crops in an efficient rotation, and thus improving the productivity of the soil, often reduces the expense of labor (as the plowing), better distributes the labor throughout the year and, by growing more crops to be fed out in winter, increases the value of products sold, returns fertility to the soil, and enlarges the profits on all parts of the farm.

The maps in Fig. 9 illustrate how a five-year rotation actually applies to a Minnesota farm. This farm contains 160 acres, all of which is tillable but is poorly organized. The average distance from the farmstead to the fields is seventy rods, and the total amount of inside fencing required to fence all of the fields is 892 rods. The map *b* is the same farm reorganized for a five-year rotation. With this arrangement the average distance of fields from the farmstead is but twenty-four rods. The amount of inside fencing required is only 640 rods. The crops are each year to be changed by rotation so that each field will produce each crop once in five years.

112. EFFECTIVE ORGANIZATION OF THE WORKING FORCE[1]

By W. J. SPILLMAN

In studying farm organization, our interest in the crop relates to the amount and kinds of labor required in the management of the crop and the equipment necessary in performing that labor. In order to formulate a cropping system that will give an equitable distribution of labor during the season, we must know the following facts concerning each crop to be used in the system:

1. The kind and number of operations required by the crop from the beginning of the seed-bed preparation to the marketing of the product.

2. The crews (men, horses, and machinery) that may or should be used in performing these operations.

3. The dates between which each operation may or must be performed.

4. The amount of work each crew should perform in a day. This involves standards of farm labor for all possible kinds of farm work.

5. The proportion of time at all seasons of the year that can be devoted to the kind of work to be done. This requires a knowledge of the average amount of time lost because of unfavorable weather, holidays, unavoidable delays, etc.

These five classes of data concerning a farm enterprise constitute the fundamental farm-management data concerning that enterprise.

[1] Adapted from *Bulletin 259, Bureau of Plant Industry, United States Department of Agriculture.*

Until they are made available it will be impossible to work out, except by the slow and costly methods of experience, systems of farming that will give a satisfactory distribution of labor and which will give the farmer something profitable to do at all seasons of the year, while at the same time no part of the year will be so crowded with labor as to make it difficult to get the work done in its proper season. With such data it will be possible to formulate systems that will not only distribute the labor advantageously but will greatly reduce the number of work animals necessary to farm a given area. The average farm horse in the northern states works on the average for the year only about three hours a day. Yet at certain seasons of the year he not only works 10 or 12 hours, but the farmer seldom has enough horses to do the required work. With a properly planned cropping system it will be possible so to distribute the horse labor as to secure twice the above amount of work per horse, thus reducing by one-half the number of horses required to farm a given area. By distributing the work in this manner it will become possible to prevent a great deal of duplication in farm implements as well.

Most farm enterprises have a critical period; that is, they require more work at some seasons of the year than at others. The cotton crop, for instance, has two periods at which it demands an unusual amount of work—i.e., chopping out (thinning) and picking. A man can prepare the land, plant, and cultivate a much larger area than he can chop out or pick. It is customary in the cotton states for all the members of the grower's family who can handle a hoe or pick cotton, both light tasks suitable to women and children, to aid at these critical periods. Even with this help one man can still do all the other work on a much larger crop than an ordinary farm family can care for during the critical periods. It is clear that the limiting factor in the area of cotton a farmer can manage properly is the area he and his available labor can thin and pick. Where the available labor is limited to the members of the farmer's family, this area is so small in the case of the average family that a single horse can do all the horse labor required on the farm. This accounts for the general prevalence of one-horse farming in the South. So long as southern agriculture is based as largely on cotton as it has usually been during the last generation, the one-horse farm will be an economic necessity.

There is a better way, however, even for the cotton country. By the proper selection of enterprises the cotton grower may produce a large acreage of other crops, especially if he utilizes two horses, without

cutting down the acreage of his cotton crop. But to do this it will be necessary to select enterprises that will not require much attention, if any, during cotton chopping or picking time. One of the big farm-management problems of the South is the formulation of systems of farming that will utilize the forces that now go to waste at seasons when the cotton crop does not completely employ the farmer's time and equipment.

The critical periods for the potato crop are planting and harvest. Corn is a crop that has no strictly critical period. It gives about the same amount of work at all times, from the beginning of plowing the seed bed to the last cultivation. Even at harvest time one man can gather all the corn he can grow, though it is customary to employ extra labor at this time. Generally speaking, farm enterprises have one or more periods when so much work is required that those periods determine the extent of the enterprise in any given case.

We have already seen that the limiting factor in the area of cotton an average farmer can grow is the quantity the members of his family can pick. This is about seven bales. On ordinary uplands, where the yield is about one-third of a bale per acre, this means about 20 acres of cotton to the family. One horse can till this acreage, and as no other money crop is grown a farm of this size is usually a one-horse farm. A few acres of corn are grown, but as there is only one horse and as the cotton tillage keeps him quite busy, the corn is poorly tilled and yields very little. Because the implements used are all one-horse implements, the preparation of the seed bed for cotton, the planting, and the tilling keep the farmer busy from early in the spring until late in July. The picking then occupies the fall season quite completely. Thus, the one crop gives the farmer employment during nearly the entire season. This is one of the reasons that the single-crop system of cotton growing has persisted so tenaciously in the South; it gives employment pretty nearly as constantly as a well-planned system of farming would do, and thus enables the farmer to earn a living. The difficulty is that it does not utilize the full possibilities of the man and therefore gives him a poor living. When a man is following a 6-inch plow or a 12-inch sweep drawn by an 800-pound mule his time may be fully but not well utilized, and he is not working at his full earning capacity. What the cotton growers of the South need are systems of farming that will permit one man to employ the full power of two or, better, four horses throughout the season. This would greatly increase the earning capacity of the individual.

If the good farm lands now unused, mostly in second-growth timber, were devoted to such cropping systems the South could with its present working force grow approximately its present acreage of cotton and at the same time devote twice or three times this area to other crops. This would, of course, require a large increase in the number of work animals used as well as in implements, and this would call for much more capital than is now available to the farmers of that section. When the problems here briefly discussed have been worked out for the South and southern agriculture begins rapid expansion to its full possibilities, there will be great need of sources of agricultural credit so that the money may be had for that development.

In the Pacific Northwest there exists a peculiar system of agriculture which illustrates some of the principles here discussed. In certain sections the farmers grow little else than wheat. Unlike cotton, this crop has no critical period during which it requires a vast amount of hand labor, but can be handled from start to finish almost entirely by horse or mechanical power.

In eastern Washington the limit to the area of this crop one man can grow is the acreage of land he can prepare for seeding. In the preparation of the land one man can easily utilize five or six horses, and we actually find this number commonly used by one man. All the implements are made as large as practicable. By a further ingenious device the season for preparing the land is lengthened. A given field bears a crop only once in two years. The farmer therefore has a long time in which to prepare the land. But this time is not as long as might be expected, because the winters in that section are too wet to permit much field work and the summers are so dry that the soil soon becomes too hard to plow. But by double disking the land very early in the spring, which can be done before it is dry enough to plow, a mulch is created which keeps the soil mellow till late in June. Thus, with 5-horse teams and a comparatively long season in which to do the plowing, a large area can be prepared by one man. In fact, the typical size for a one-man exclusive wheat farm in that section is about 320 acres, on which 160 acres of wheat are grown annually. Managed in this way, a wheat farm gives the farmer plenty of profitable work to do from early in the spring until nearly harvest time. Then the harvest season gives another long period of work. In that region the varieties of wheat grown will stand several weeks after they are ready to cut, so that the harvest season is greatly prolonged,

and with the system of harvesting in vogue there is no trouble about getting all the wheat cut and thrashed that a farmer can grow. When harvest is over it is about time to begin sowing a new crop on the land that was plowed in the spring.

The only way the cotton grower can get into the class of the wheat grower from the standpoint of income is by hiring a large amount of human labor at low wages for the two hand operations the cotton crop requires. As a result of this condition, most of the cotton is grown under a tenant system by poor people, while wheat is grown by the owner of the land himself, who is usually a well-to-do farmer. This applies, of course, only to the localities where the methods outlined are practiced.

A financial comparison of the two one-man systems of farming is shown in Table I.

TABLE I

COMPARISON OF TWO ONE-MAN SYSTEMS OF SINGLE-CROP FARMING

CROP	CHARGES			INCOME	
	Rent	Interest and Depreciation on Equipment	Total	Gross*	Labor*
Cotton	$ 72†	$ 15	$ 87	$ 350‡	$ 263
Wheat	1,152§	165	1,317	2,880‖	1,563

* The farm expenses other than rent, depreciation, and interest on crop equipment are not here taken into account. Hence the labor income given is not the net income.

† Twenty acres at $3.60.

‡ Seven bales from 20 acres.

§ Three hundred and twenty acres at $3.60.

‖ Four thousand eight hundred bushels (from 160 acres) at 60 cents.

113. ECONOMY OF HORSE LABOR[1]

BY G. F. WARREN

The economical use of horse labor is as important as man labor. In Minnesota, in 1907, the cost of an hour's work of a team in different counties varied from 15 to 22 cents per hour (see table). Man labor averaged about 12 cents. The time of the team is, therefore, worth much more than the time of the driver. Where feed is worth more, the difference is still greater. There are few, if any, regions in the

[1] Adapted from *Farm Management*, pp. 344–49. (Copyright by the Macmillan Company.)

United States where horse labor is cheaper than in Norman County, Minnesota. On New York farms, horse labor usually costs 25 to 30 cents per hour for a team. Man labor costs 15 to 20 cents per hour. Economy of horse labor is, therefore, seen to be even more important than economy of man labor.

COST OF HORSE LABOR

	Year	Food Cost per Horse	Total Cost per Horse	Hours Worked per Day	Cost per Hour Cents
Norman County, Minnesota	1907	$ 47	$ 77	3.0	7.7
Lyon County, Minnesota..	1907	64	93	3.4	9.0
Rice County, Minnesota...	1907	75	104	3.1	11.0
Farm No. 1, New York....	1911	92	131	2.9	14.9
Farm No. 2, New York....	1911	90	174	3.8	14.8
Farm No. 3, New York....	1911	117	177	4.9	13.1

The chief reason for the high cost of horse labor is the large amount of time that horses do not work. On the farms in Minnesota the

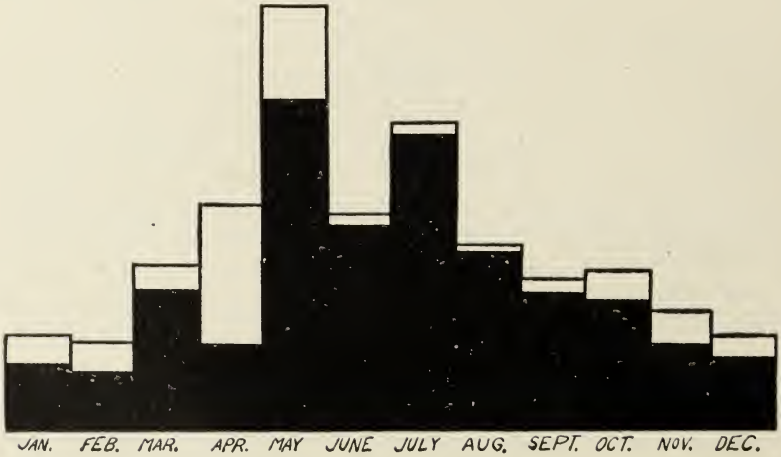


FIG. 1.—Distribution of horse labor. Seven horses kept. If done at the proper time, the work could be better done with five horses. Black is work fixed as to time; white is work that could have been done at some other time.

horses averaged a little over 3 hours a day for 300 days. On Farm No. 3 in New York, an unusually well-organized farm, they worked 4.9 hours. This farmer kept lists of work for all kinds of weather, so that all odd jobs were done when the teams could not work. A

farmer should look upon an idle team in the barn in exactly the same way he looks upon a hired-man asleep in the haymow. If the high cost of horse labor were realized, horses would be worked more.

There are many ways of saving horse labor. The most evident way is to keep the horse busy, and so reduce the cost per hour. By planning the work ahead it is often possible to do the work with fewer horses. The horse labor for Farm No. 1 is shown in Fig. 1. The farmer kept two extra horses at a cost of $262, when the only time he needed them was in plowing for oats and corn. If he had fall-plowed for oats, he would have secured a better crop of oats, could have fitted his corn ground earlier and better with two less horses, and have had considerable time to spare.

One horse raises from 9 to 28 acres of crops in the different counties studied. In all these regions the larger and better managed farms doubtless raise more crops per horse. If a farm is diversified, good sized, and well managed, a horse can raise almost twice the average area of crops. On many well-managed farms there are 30 acres of crops per work horse or mule, and occasionally 50 acres when the crops include tilled crops, small grain, and hay in such combinations as to make a full season's work. If the crops are mostly tilled crops, the area per horse should rarely fall below 25 acres.

114. THE PROBLEM OF THE FEEDER[1]

By HENRY PRENTISS ARMSBY

Mechanically there is in some respects a very close likeness between the animal body and what are known as internal-combustion motors, i.e., those engines in which power is developed by burning liquid or gaseous fuel (gasoline, alcohol, producer gas, etc.) in the cylinder of the engine itself. Such an engine requires two things for its operation: (1) sufficient repair material to keep its working parts in running order, and (2) a supply of fuel in proportion to the work to be done. Just these same two things are what the animal requires—repair material and fuel.

In one respect, however, the animal body differs from the artificial machine—it cannot be stopped and started again at will. As long as the animal lives the vital machinery is in operation, although less actively at some times than at others. The animal might be

[1] Adapted from *Farmers' Bulletin 346*, pp. 9–10.

compared to an automobile whose engine must be kept running at a low speed in order to have the power available when needed.

That the feed of the animal is its source of both repair material and fuel is sufficiently obvious. If we knew exactly the requirements of the animal in any given case, and if we knew exactly what amounts of protein (repair material) and energy (the fuel material) the feeding stuffs at our disposal could furnish, the computation of a ration would be almost purely a matter of arithmetic. We should simply have to devise a mixture of the feeding stuffs which would yield the requisite amounts of protein and energy and would at the same time be of suitable bulk and of such a character as to exert no injurious action upon the animal. As a matter of fact, we have no such exact knowledge. Practically, animals vary in their requirements, while feeding stuffs of the same name show a wide range in composition, digestibility, and nutritive value. Furthermore, what is still more important, the economic conditions vary from case to case, so that, for example, a very liberal ration might be advisable in one instance, while for the same animal under different conditions it would be highly uneconomic. A man's ability as a feeder will be shown, first, in his power to estimate the conditions which will modify the feed requirements of his particular animals and cause his feeds to vary from the average, and, second, in the skill with which he can interpret the daily results and modify his feeding in accordance with them.

When feeding stuffs must be purchased in order to get the desired relation between the protein and the energy of the ration, it is evident that often a wide range of choice may be offered. In such a case the question at once arises, which of the various feeds available it is most economical to purchase, it being evident, of course, that this is not necessarily the one offered at the lowest price. In all these and similar matters common-sense is necessary. The computed ration expresses the best estimate that can be made of the actual average requirements, but it is at best more or less of an approximation. It would be foolish, therefore, to seek extreme exactness in realizing it or to go to more expense in the weighing and apportioning of the feed than the saving in the latter would amount to. The scale upon which the feeding is conducted will play an important part. Where scores or hundreds of animals are being fed, an exactness may be profitably sought which would be absurd in the case of two or three animals.

115. ECONOMY IN THE USE OF PLANT FOOD[1]

By CYRIL G. HOPKINS

For practically all of the normal soils of the United States there are only three constituents that must be applied in order to adopt systems of farming that, if continued, will increase or at least permanently maintain the productive power of the soil. These are *limestone, phosphorus, and organic matter.*

Where such natural materials as chalk and marl have not been accessible, more or less use has been made of water-slacked or air-slacked lime; because, by burning and slacking, limestone rock may be reduced to powdered form and thus distributed over the land. With the development of rock-crushing and rock-grinding machinery, fine-ground natural unburned limestone can be had, and, where material can be gotten at reasonable cost, it replaces all other forms of limestone used for the improvement of normal soils. The manufacturer in hydrating lime simply converts, at considerable expense, the slower acting carbonate to the caustic hydroxid form. This is a powerful agent in hastening the destruction of organic matter, stimulating the soil at the expense of permanent fertility.

So much has been said and written regarding the value of farm manure that it is common talk that the manurial value of the food is almost wholly recovered in the manure; and there is even a vague notion in the minds of some that the manure is worth more for soil improvement than is the food from which the manure is made. The fact is that the most important and least appreciated method of obtaining or increasing the supply of organic matter in the soil is by the use of *green manures and crop residues.* A ton of clover plowed under will add nearly three times as much organic matter to the soil as can possibly be recovered in the manure if the clover is fed. Nitrogen may also (besides that secured from organic matter produced on the farm) be bought in the market in such forms as dried blood (14 per cent), sodium nitrate (15½ per cent), and ammonium sulphate (20 per cent); but when we bear in mind that such commercial nitrogen costs from 15 to 20 cents a pound, and that one bushel of corn contains about one pound of nitrogen, it will be seen at once that the purchase of nitrogen cannot be considered practicable in general farming, although in market gardening and in some other kinds of

[1] Adapted from *Soil Fertility and Permanent Agriculture*, pp. xxii, 157–62, 199, 200, 207, 237. (Copyright by Cyril G. Hopkins. Published by Ginn & Co.)

intensive agriculture commercial nitrogen can often be used with marked profit.

The average investment required for 25 pounds of phosphorus is about 75 cents in 200 pounds of fine-ground natural rock phosphate of good grade, about $2.50 in 200 pounds of good steamed bone meal, about $3.00 in 400 pounds of good acid phosphate, about $6.00 in 600 pounds of the average "complete" commercial fertilizer, and about $80 in manure made from corn costing 40 cents a bushel. It is important to understand and to keep in mind that average farm manure is poor in phosphorus in comparison with its content of nitrogen and potassium, especially when made from the produce that remains after part of the grain has been sold from the farm, and more especially when used in connection with a rotation including legume crops and on soils abundantly supplied with potassium but poor in phosphorus. In other words, under such conditions average farm manure is a very poorly balanced fertilizer, and if used even in moderate quantities the production of stalks or straw is likely to be excessive in comparison with the yield of grain; and the small grains are also likely to lodge, because the unbalanced ration produces weakness even in straw of large growth.

F. Forms of Business Organization

116. INDIVIDUAL ENTERPRISE—THE FAMILY-FARM[1]

By G. F. WARREN

Farming is essentially a home enterprise. It is very different from most city occupations. The success of a farm is dependent on the entire family. All the members of the farm family take some part in the farm business. The women usually help by taking care of the hens and in some of the other farm work. They go to town to get farm supplies, often board some of the hired help, and usually take a considerable part in other farm operations at times of unusual pressure of farm work. They often direct the farm work during the absence of the head of the family. Children on farms practically always help with the work. There are many things that a small boy can do as well as a man. This gives an elasticity to the farm labor supply, and results in considerable economies, since women and children can help out at rush times and avoid the hiring of other per-

[1] Adapted from *Circular No. 24, Cornell Experiment Station*, pp. 32–33, 38–39.

manent help. A reasonable amount of such work is beneficial to health, and it is rare indeed for a farm boy to be harmed by the work he is called upon to do. This is in contrast to industrial employments, where the conditions of work are unsuited to children, so that higher-priced adult workers must be used. Children on a farm learn to take life and work seriously. They have the best form of apprenticeship by working with their parents. And the work they can do when quite young, even though light and intermittent, fits into the whole scheme of the enterprise in such ways as to add very considerably to the product. This is one of the reasons why farming does not lend itself to consolidation, such as readily takes place in manufacturing.

The factory system is based on high-priced supervision. Most of the workers have only a few things to learn, and they are under close supervision. It is impossible to give close supervision to large farming enterprises because the workers are so scattered. For general farming, 40 to 80 acres of crops can be raised per worker. The number of men that might be gathered under one roof under the supervision of one superintendent would in farming be scattered over half a county.

For nearly all farm operations it is necessary that each worker be intelligent and that he take an interest in the work. We cannot have a boss watching the man on a mowing machine. If someone has to watch the driver, he may as well replace the driver and do the work himself. There are a few operations at which gangs of men can be used, but there are very few cases in which a farmer can make a continued use of a gang of men. It is very difficult to get men to take the necessary interest in large farms. If wages are high enough to attract men who will take an interest without close supervision, the high wages take all the profit.

A profit of 10 to 20 per cent on the wages of each worker is a good profit in any industry. If the industry employs a very few men, the profits will be small.

The expense of hauling crops and manure usually makes about 600 acres the limit to run from one center. But for general farming this area with half the land in pasture is a business that, measured in workers, corresponds with a grocery store that employs two or three clerks and one or two delivery-men.

The prices of farm products are based on production by the farm family working as a unit. The hired help is usually boarded in the family at much less than it costs to hire it boarded. The women wash

the milk pails, care for the chickens, go to town on errands. They very frequently take the place of a man at these light operations, and also very frequently help with farm work. In Delaware County, on 210 of the rather large dairy farms, 20 per cent of the milking and caring for cows was done by women and children. On the smaller farms, the proportion of such labor is much more. All this labor is directly interested. When men are hired to run large farms, it is exceedingly difficult to produce farm products at the same cost at which they are produced by the family-farm system.

More conclusive than the reasons for failure are the results. Literally hundreds of successful business men scattered from the Atlantic to the Pacific have tried running large farms with hired managers. Most of these men have demonstrated their ability to make money in cities. The writer has seen many such farms in a number of states, but has not yet seen a case in which a man who made a fortune in a city has ever added to his accumulations by running a large farm with a hired manager. There are many cases in which the live stock has taken premiums innumerable and the crop yields have been all that could be desired, but the profits have always been book profits. No farm is a success that does not pay all expenses, a reasonable rate of interest, and good wages to the operator, and have enough money to provide for depreciation. Many college graduates have undertaken the management of such farms. Formerly the writer recommended some of them for such places, but so far the writer has never seen an instance when such a farm paid. Yet these same college graduates have by the hundreds demonstrated their ability to make their own farms pay. Part of the difficulty is the erroneous attempt to apply the factory system to farming operations.

117. THE DEMAND FOR INDUSTRIAL ORGANIZATION IN AGRICULTURE[1]

By ROY HINMAN HOLMES

The very evident desire of so many country people, both young and middle-aged, to get away from the farms, coupled with the impossibility of an influx from without to fill the places of those who leave, indicates clearly that the system of farming, as we know it, cannot indefinitely continue. At the present time so many of the farmer families have left the land that in many localities those who remain

[1] Adapted from "The Passing of the Farmer," *Atlantic Monthly*, CX, 517–23.

are tilling such large areas that the work cannot be other than superficially done.

In the old days, the neighborhood group was very often entirely self-sufficient. It was the natural thing for the farmer who had more sons than could profitably be employed upon the home acres to allow one or more of the boys to spend a portion of the year in the employ of neighbors who were without sons. Though it was an economic misfortune to be without strong and willing boys in the home, yet one could usually depend upon hiring neighbor boys for just the length of time that help was needed.

The multiplication of radiating influences from the rapidly developing modern city has swept away the old days. The growing sons and daughters are spending more and more time in the schools. The well-to-do farmer very naturally wishes his children to enjoy as good educational advantages as the children of the town merchant. His own children gone, he calls in vain now for the assistance of the young people of the neighborhood. They, too, are at school, or, if at work, are in the shops and stores of the city. The old group is broken, and help, if it comes, must come from without. Efficient single men and women for farm labor may seldom be found today at any wage, and the supply of inefficient laborers is becoming continually less.

There seems to be no lack of capable married men who are glad to work on the farms for pay equivalent to their city wage. They must be made certain, however, of work for the entire year, and their pay must include the rent of suitable dwelling houses. The farmer of today, as a rule, is not in a position to take advantage of this source of labor supply. Hence, his fields are imperfectly tilled and his crops improperly harvested.

The merchant has no difficulty in obtaining workers. For him, the "Help Wanted" sign brings scores of applicants. The manufacturer often has a "waiting list" to choose from. That these men may hire while the farmer may not is a social discrimination against the occupation of farming that cannot long be withstood.

Undoubtedly the primary fault in the occupation, the one fundamental thing which is rendering the present system of farming the least popular calling in the modern scheme of things, is its lack of opportunity for specialization in labor. In these days of the expert, the farmer is inexpert and therefore lonesome. In the cities, the men of every calling, from the surgeon to the chimney-sweep, pride

themselves upon doing one thing well. The farmer alone is the jack-of-all-trades. Though the trend is toward specialized lines of production, the farmer's labor remains, as it was in the beginning, unspecialized as to processes. With the coming of more complicated agricultural machinery to be handled, and the growing necessity for thorough study of soils, of insect pests, and of the markets, the farmer is yearly brought face to face with more complex demands.

To manage and do the major part of the labor, satisfactorily, on a farm of eighty acres, demands on the part of the farmer several lines of proficiency which are seldom found combined in any one individual. He must have the strength and physical endurance of the unskilled laborer, combined with the ingenuity and mechanical ability of the skilled workman. He must be somewhat of a student, an authority on matters connected with the science of agriculture. As a student, he must also have something of the spirit of the investigator and experimenter, for his own farm presents problems for which he can find no solution in the books. He must be a business man competent to manage a large and complicated undertaking, or much of his labor will be wasted. The typical farmer, in his attempt to make a creditable showing upon each of these counts, attains no better than second-rate efficiency in any single line. Comparisons with the city expert are bound to make him uncomfortable. However, such comparisons, although unjust to the individual, are yet inevitable. It is told to all that he is a poor business man, a superficial student, a bungling mechanic, and a clumsy laborer. He is made to feel that he is a misfit on the land and in the work of his inheritance. He is rather severely punished for marching in the rearguard of a vanishing procession.

The pioneer days are over. The present call of the land is not unlike the call to other activities. It is to men who have money to invest, and to those who have expert knowledge and ability of some sort. As the farming class was called into being by the existence of abnormal land conditions, it is very natural to expect that as conditions become normal the class will be merged back into the society from which it sprang, and the task of agricultural production taken over by the classes of modern industrial organization—by the capitalist, the manager, and the laborer. The laws of social and economic development which brought the factory are in operation still. Agriculture is but a form of manufacture, and its development must be along the lines marked out by the development of manufacturing in

the past. The little shop in which the owner and his family lived and performed all the labor, both mental and physical, connected with the manufacture of wagons or shoes has given way to the great plant employing thousands of specialists. The small farm of today is similar in its organization to the shop of yesterday, and must as surely give way.

The farmer does not leave the farm because it is in the country. He turns away from it for the same reason that the cobbler turns from the shop—because he feels it to be out of harmony with the life about him. The real "isolation," which we are to understand is the prime reason for the unrest of the farmer, is not physical, it is social. It does not consist in the fact that his nearest neighbor lives a quarter of a mile or more away, but rather in the fact that he is a farmer: his occupation and necessary mode of life do not fit well in the modern scheme. If physical isolation were the cause of the discontent, modern improvements in methods of communication would do much to bring contentment. It is noticeable, however, that in those communities best provided with modern conveniences the drift cityward is most rapid. The more closely men are drawn together, the more surely does the old order pass.

Though the pioneer's work was well done, it is now finished. There is no especial reason to look for the expert agriculturist of the future among the descendants of the pioneer farmer of the past. The men who are to carry on the agricultural production in the coming days are being prepared in the cities for their task. As the new civilization is urban, so the new farming is of necessity a specialized department of urban life. There cannot long remain the distinction implied in the terms "townsman" and "countryman." All men will be grouped in the tables according to occupational divisions. The question will be not, "Where does one live?" but rather, "What does one do?" Country work will be as well subdivided as the work of the cities, and for the most part according to the same divisions. The agricultural expert will direct the labor in the fields as do other experts the various processes in the great shops. Agricultural production will have come into its own.

One of the greatest social advantages which we may hope to derive from the change is a vastly increased opportunity for laborers now crowded into the cities to find work in the country fields. One would expect to see a continual shifting of the laborers of the poorer classes back and forth between the town and the country. The more

of these people who can be brought into direct contact with the soil, the better. America has in the past looked to the farm for the rejuvenation of her social vitality. The land will probably much better serve social needs under the new system than under the old, for the healing influences of the soil will be applied directly to those of our people who stand most in need of healing. It is not the few who can afford to own farms who most need the benefits of country life, but rather the many who can neither buy nor rent. Under the new order they and their children will receive a blessing which might never come to them in the old, and the whole of society will be benefited thereby.

118. THE NEED OF A LARGER UNIT OF ORGANIZATION[1]

By O. F. COOK

The American cotton industry presents unusual opportunities for improvement through community organization. Many important advantages are not to be realized by individual farmers working alone, but require the united action of entire cotton-growing communities. Only in this way can improved varieties and other results of scientific investigation be effectively utilized. The present unorganized condition of such communities limits the power of the individual farmer to improve his crop. Organizations of southern corn growers are learning some of the advantages of co-operation in the improvement of a crop, but other and still greater advantages are to be gained with cotton by organized effort on a community basis.

A right choice of methods is as necessary in applying the results of scientific study as in conducting investigations. Methods of improvement well suited to other crops are entirely inadequate with cotton. The crossing of varieties in the field and the mixing of seed in gins render it unusually difficult to preserve the uniformity of superior varieties. Uniformity is more important with cotton than with corn, because the fiber is used for manufacturing purposes. Selection is more difficult with cotton but has a double value, for uniformity not only increases the yield but adds to the commercial value of cotton.

Two things are necessary for any adequate application of the results of scientific investigation to the cotton industry: (1) the superior varieties that are bred must go into general use, and (2) their

[1] Adapted from *Yearbook of the Department of Agriculture*, 1911, pp. 397–407.

uniformity must be maintained by continued selection. Experience has shown that neither of these objects is likely to be attained by the miscellaneous distribution of small quantities of seed. Such distribution serves to introduce a variety to the farmer's attention, but this is only the first step toward effective utilization. Unless new varieties are adopted by whole communities instead of by scattered individual farmers, there is no prospect that their full value will be realized or that their uniformity will be maintained. These objects would be much easier to secure if each neighborhood or group of farmers who grow their cotton in adjacent fields and carry it to the same gins could act together as communities. The community should agree, if possible, upon the planting of one kind of cotton and take measures for maintaining the purity and uniformity of the stock by continued selection under the local conditions. This would mean larger crops, better fiber, and higher prices, not only because of the improved quality but because each community would be able to produce a commercial quantity, a hundred bales or upward, of the same uniform type of cotton.

If the skill and discrimination now used in buying and selling cotton could be applied to raising it, the product would be greatly improved. Community organization would aid in bringing this about by enabling the farmer to acquire special knowledge like that used by the buyer in separating and grading the different kinds of cotton.

Manufacturers have no use for miscellaneous small lots of cotton, like those produced in unorganized communities where each farmer is likely to plant a different variety and follow a different method of culture. The commercial selection and assembling of commercial quantities of the different grades and qualities of cotton, as carried out by the buyers, is a necessary part of the present system, and is to be avoided only in communities that devote themselves to the production of a uniform type of cotton. Many dealers refuse to consider the essential qualities of length and strength of fiber in buying the cotton from the farmer. A farmer who takes the trouble to raise a crop of superior fiber and is then refused a premium can hardly be expected to repeat the effort. He is more likely to apply to the Department of Agriculture for a variety that will produce the most pounds of lint without regard to quality. At the same time come requests from manufacturers that the planting of long-staple cotton be more actively fostered. These conflicting demands show that the

present system is not advancing the true interests of either the producer or the manufacturer, to say nothing of the ultimate consumer.

The fundamental agricultural advantage to be gained by community organization is the production of uniform crops of cotton. The cotton industry will show little improvement from the breeding and distribution of superior varieties until better provision is made for preserving the uniformity of select strains. Superior varieties are of practical value only to the extent that they are preserved and utilized for purposes of production. No matter how desirable in other respects, a variety of cotton cannot be considered superior unless it is kept uniform, nor can any variety be expected to remain uniform unless selection be continued and admixture with other varieties be prevented.

In addition to gaining familiarity with improved varieties and methods of selection, many other improvements could well be studied by organizations of cotton growers. Cultural methods that appeared satisfactory before the arrival of the boll weevil have become entirely inadequate for the production of crops in the presence of that destructive insect. Local conditions of soil, climate, labor supply, and relation to other crops differ so much that each locality is likely to require a cultural system of its own if the best results are to be secured. A co-operative study of cultural problems by cotton growers' associations would be a factor in local progress, for the community would profit more promptly by the efforts of those who have the taste, ability, and judgment to experiment with different methods and draw correct conclusions.

119. ORGANIZING THE COMMUNITY FOR PRODUCTION[1]

By T. N. CARVER

Our plan for the organization of a rural community begins with the committee on production. The greater part of the actual work of production can probably be carried on most economically on individual farms of a size which can be cultivated mainly by the labor of one family. This calls for very little co-operation or organization. But the study of the problems of production can undoubtedly be carried on most effectively in co-operation. If a hundred men in a community are all studying the problem of growing the crops of that community, but each man studies alone and does not exchange ideas

[1] Adapted from *Yearbook of the Department of Agriculture*, 1914, pp. 97–101.

with his neighbors, each man profits only by his own study; but if they meet frequently to discuss their common problems and to exchange ideas, each man profits, not only by his own study, but by that of all his neighbors. Again, much of the work of organized marketing must begin before there is anything to sell. It must begin with production. Successful marketing consists, first, in finding out just what the consumers want and how they want it packed and delivered. To get the whole community to grow a uniform product such as the consumers demand requires organization of the community to standardize its production. Again, to stimulate rivalry in improving the products of a community, both as to quality and quantity, requires an organization to recognize and show some appreciation of merit.

This committee should also study to discover new methods of increasing the productivity of the community, new crops, new and improved methods of soil treatment, the field selection of seed, scientific breeding of live stock, and even the conservation of manure. Too much emphasis can hardly be laid on the importance of organized promotion of breeding enterprises. So long as this is left wholly to individual breeders, each one working alone, no great headway can be made by small farmers with little capital. We have depended wholly upon importation from abroad, and, in spite of the millions of dollars which have been expended for imported breeding stock, there is probably no European country which has so much poor stock as the United States, and there are not many where the average is so low.

One reason for our indifferent success in animal breeding has been the lack of neighborhood organization. Where a whole community is interested in the same breed of live stock, where practically every farm is a breeding station, there is, first, a wider basis of selection than where only one farm is given over to that breed. A wider basis of selection makes possible more scientific mating than is possible where there are only a few breeding animals from which to select. In the second place, a neighborhood enterprise of this kind gives greater permanency and continuity than is possible where only a few individual farmers are interested. It has happened so often in this country that it may almost be said to be the rule that by the time a successful breeder has built up a superior herd, stud, or flock his life is drawing to a close, his sons have moved to town, and his animals are scattered. If, on the other hand, the whole community in which

such a breeder lived were engaged in developing the same breed instead of a large number of different breeds, his animals would probably remain in the same neighborhood and be crossed with others of the same breed. When this happens the work of the individual breeder is not lost, but is enabled to count in the improvement of the stock of the country. Under our present highly individualistic methods, the farmer who enters upon a breeding enterprise frequently, if not generally, makes the initial mistake of selecting some breed which is new to his community in order that he may have something different from anything possessed by his neighbors. It is safe to say that a neighborhood whose farmers behave in this absurd manner will never become distinguished for the excellence of its live stock or of its field crops.

120. THE POSSIBILITIES OF CO-OPERATION

In order to understand the gains which may be expected from co-operative organization of agriculture, we should have clearly in mind the shortcomings of the individual type of organization as exemplified by the family-farm, and examine the precise way in which co-operation is supposed to remedy these defects. It is quite evident that the farm of comparatively small size is bound to remain the most efficient operating unit under any type of agriculture which we can foresee. The personal interest of the farmer and the suitability of the family labor group do not, however, mean that such organization secures the most effective possible utilization of the labor factor in production. Though well suited to the routine operation of the farm, it does not secure what is demanded by modern scientific methods of agriculture, in the way of specialized forms of labor ability. The average farm needs a little engineering work, a little veterinary science, a little scientific plant and animal breeding, tree pruning, special business ability and training, or what not. Even if the farmer be the graduate of an agricultural college, he cannot expect to become as expert in any one of these lines as can the man who makes it his profession. Some, but not all, of these kinds of specialists can be hired by the farmer when he needs them, but, in practice, he fails to get their services adequately organized into his enterprise. The large corporation solves its labor problems of this sort by decentralizing operation among such number of plants as are needed for technical efficiency and centralizing specialized services so as to keep such workers fully employed. Theoretically, there is no reason why co-

operation cannot effect a like efficiency in the organization of the labor factor in agricultural production. The co-operative cow-testing association may employ a trained animal husbandman to supervise the operations of all its members; the co-operative fruit associations may secure special labor in pruning, spraying, packing, and selling. The essential difference between the incorporated and the co-operative form of association in this regard is that in the former authority goes with the supervisory worker, whereas in the latter he is too often only in an advisory position. This question of control we shall return to later.

The second weakness of individual enterprise in agriculture concerns the capital factor. Since agriculture has passed into the capitalistic stage, economy in equipment on the one hand and operating efficiency on the other have become the two conflicting goals which the farmer is trying to reach. The family-farm has too much invested in capital-goods for profit and too little for full efficiency. Can co-operation solve this difficulty? Evidently it cannot do so by consolidating the operating units into monster plants similar to our great industrial establishments. But it can organize together groups of the existing small units, so as to give larger employment to an expensive piece of machinery, or to secure full utilization of a costly breeding animal, or build a community packing-shed and equip it with appliances that would be utterly out of the question on a single farm. Here again we meet with the administrative problem. It is in many cases impossible to give the same service to all. The corporation can guide its actions by considerations of largest total profit, no matter from which of its plants or departments it may be derived. The co-operative association cannot thus wave aside personal considerations, but is constantly confronted by nice questions of justice and equality among its members.[1]

But these considerations of faulty organization of the labor and capital factors in agriculture, and the benefits possible through co-operation, sink into minor importance as compared with the problem of directive and administrative efficiency—the function of entrepreneurship. The conspicuous successes of consolidated industrial

[1] Undoubtedly, the mere fact of size, which comes of pooling their business interests, gives to the co-operative group numerous commercial advantages. Through its improved bargaining position it can sell products, buy supplies, hire labor, and borrow funds on better terms, ship at lower rates, and secure better service than as individuals.

enterprises have been due in large measure to the selective development of a class of business directors, promoters, and organizers, and the putting of the control of enormous units of our productive resources into their hands. It is such captains of industry who decide upon aggressive development in this direction, complete or partial withdrawal from that field, and the marshaling of men and money to a wholly new line of production elsewhere. The gathering of executive authority into the hands of a small group of persons of specialized abilities has made possible decisive action, a thing frequently necessary in order to take advantage of opportunity or to avoid loss.

Now the question forces itself forward: How far does co-operation consolidate such entrepreneur functions in the hands of those able to exercise them wisely? Clearly it does not give imperial control to a few lords of industry, who can then exploit their fellows, as the corporation sometimes does, no doubt. Does it, on the other hand, leave all policies to be determined on a "one-man-one-vote" principle, that leaves it on its former plane of inefficiency? Or does it delegate power for immediate action to men chosen because of demonstrated fitness, and responsible to those affairs they direct? Undoubtedly many of our successful co-operative associations are thus intrusting their selling policies to keen and well-trained salesmen, and to a limited extent are putting parts of their producing operations under similar control. It is worth while, however, to pause and ponder how fully and in what manner co-operation offers a better solution to the problem of business entrepreneurship.

We should realize, too, that to quite an extent we are tending to keep the old type of unorganized operating units, while we concentrate both specialized abilities and administrative wisdom in public bureaus—the United States Department of Agriculture, the agricultural colleges of the various states, the experiment stations, state commissioners or boards of agriculture, county demonstration agents, and the like. This is not socialism, since there is neither government ownership nor operation. It might be called "individual enterprise under government patronage," and apparently presents opportunities for tremendously effective organization of some parts of our agricultural resources, through pooling of interests and efforts on the largest scale.

The economic bearing of these facts has not as yet been carefully studied or discussed. Indeed, the process itself is still in the early stages of hardly conscious evolution. But it seems possible that it is

the most potent single force at work upon our agricultural system today.[1] However that may be, we must keep clearly in mind the fact that the goal of any kind of business organization is to make the most effective co-ordination of natural resources, accumulated wealth, and human powers of all sorts—physical, mental, and spiritual—toward the end of creating the maximum product from the land. This test must be applied to all, from the humblest individual farmer to the state itself.

[1] Besides its effect upon economy and efficiency of production, it may prove to have an important bearing upon the distribution of incomes derived from agriculture. If it be true that most large accumulations of wealth have come as a reward to shrewd entrepreneurship—which means the exploitation of a natural monopoly—may not this socialization of entrepreneurship go farther than anything else could to maintain a truly democratic type of organization in agriculture?

VII

RECORDS AND ACCOUNTS AS MEASURES OF EFFICIENT MANAGEMENT

Introduction

The preceding chapter has had much to say concerning the work of the organizer in directing the farm enterprise into profitable channels. It is evident, however, that if he is to find and follow the pathway of economic efficiency he must not rely upon his current impression of what he is accomplishing, but must employ some definite means of measuring his farm operations and keeping a quantitative record of results.

This does not mean that we should open up a complete set of books and establish an accountant on every farm. Accounts are merely a means to a particular end and should be the simplest means of securing certain facts for the farmer. It is a mistake to suppose that all these facts need to be reduced to dollars. The bank's records are in that form because the bank's operations are all financial in character. The merchant's accounts are quite similar. Many a farmer makes hardly more cash sales in a year than the ordinary merchant does in an hour. His whole year's business may be covered by the twelve checks he receives from the creamery or an even smaller number of remittances for stock shipped. If his family does all the work on the farm and he settles his store bill quarterly, he can probably carry all the figures of his money transactions in his head.

To set these figures down in a careful set of double-entry accounts would, of course, guard against errors and have a certain value. But much more important for the success of his future operations would be a record of the quantity and quality of milk produced by each individual member of his dairy herd, or of the number of hours of productive labor of each horse, the work record of each man hired, and the amount of feed secured from various fields planted to the different crops. The farmer very likely knows what income he derived from his farm; what he needs to find out is which animals or which fields contributed to that profit and in what proportion.

Such records, however, tell only a part of the story. If the farmer has any money invested in the farm enterprise, his cash income may not give a correct report of the results of the year's operations. The value of his capital may have increased or decreased as a result of the growth of his farm property or its depreciation through use. Only by making an inventory at regular intervals can such profits and losses be adequately recorded. If real estate be included in this inventory, however, a danger appears. Increase in the value of the farm may cause it to show an apparent profit, whereas there has been an actual loss in operation. Ordinarily this danger is only for the man who is willing to deceive himself, but if the increase in value is due to the increase in productivity of the soil as the result of better farming, there could hardly be objection to including it as a true gain from operation. Particularly, if the farm practice has subordinated cash returns to this building-up process, such improved fertility must be reflected in a higher valuation, or the accounts will fail to tell a true story. Finally, the inventory serves to determine the amount of the gross income which shall be credited to labor, by setting the amount upon which interest must be first allowed.

Section C shows two simple systems for bringing together such financial records as will enable the farmer to ascertain the amount of income, whether in form of cash or capital, which has resulted from the year's operations, and also to indicate the distribution of that income between the labor and the capital which have co-operated to produce it. Here again we find opportunities to apply the comparative method of studying the efficiency of the farm business without resort to the more complicated methods of cost accounting. We have already spoken of the possibilities of comparing the performance of different productive units, even if not reduced to a financial basis. In selections 128 and 129 we see two possible ways of detecting the strong and weak points of management by comparing with conspicuously successful farmers or with what have been worked out as normal standards.

In section E, Professor Taylor has admirably pointed out the application of cost-accounting methods to the study of the organizer's problems. There are two questions which properly emerge from any scrutiny of cost-accounting data. The first is, "Can costs of production be lowered?" The cost accounts show, not only what the product cost, but also the elements which went into that total. A careful study will serve to reveal leaks in the use of man labor or horse labor,

or will show where fertilizer expense was ill advised or where other wastes occurred. After all such defects in management which can be remedied have been attended to, the question arises, "Can some other crop be substituted for this one and result in greater profit?" Often crops which make a large gross return are found upon examination of their cost accounts to net a smaller profit than others which appear to be less desirable.

The mere making of such records as we have been discussing causes the farmer to get a new and helpful point of view. He gets outside the routine of daily work and looks at the enterprise from the position of the entrepreneur instead of that of the laborer. From day to day his mind is so filled with the practical details of operation that he often loses sight of the larger economic bearings of his work. Pride in the appearance of his farm may cause him to forget the financial aspects of the process by which that rustic beauty is secured. Love of animals may result in his ignoring the fact that he is keeping some very expensive pets. The enjoyment he gets out of running power machinery may blind him to the high cost of owning certain farm equipment which might be dispensed with. The account book plays no favorites. Likewise the keeping of accounts involves a process of analysis which results in the discovery and appraisal of items which the farmer has been all too prone to overlook. Such are the depreciation of property values, the marketable value of unpaid labor, and the interest-earning capacity of invested capital. Not until he sees the nature of these values can the farmer be expected to take them into his reckoning. The study and interpretation of his records and accounts is the beginning of wisdom for the farm entrepreneur—who determines the ultimate character and direction of agricultural enterprise.

However, we must not stand up so straight that we bend backward; we must not charge values that do not exist. The general rule for farm cost accounting is to charge both labor and materials at market value. But often things which are not marketable are so charged, and the result is misleading and sometimes absurd. For instance, if stock are raised on feed that would otherwise go to waste and are cared for in time that would otherwise not be profitably employed, charging these at the market rate for salable feed and employed labor gives an apparent loss on a venture which was unquestionably profitable. The cows that are herded along the roadside by

a ten-year-old boy can hardly stand a labor charge of ten cents an hour. Neither can the colt that the boy raises be so charged for time, nor for what feed it picks up at the straw stack, at the town price of straw less the cost of baling and hauling. Caution as well as zeal should go into the making of cost accounts.

Probably the greatest source of error and confusion in our farm accounts is to be found in the fact that the farm business and the farm home are not separate. This results frequently in the burdening of the former with expenses which properly belong with the latter. There is the residence, which is often used for storage of the products, quarters for the hired help, and even as a workshop where butter is manufactured, chickens are hatched, seeds tested, and so forth. On or two driving-horses are kept largely for family use, but they are also used to go to town on errands and for light work in the fields. Anyone can add to this list of overlapping uses, but the point is that when the year is done and the profits and expenses are checked up on the books, it should not be forgotten that the farm family has already consumed a large amount of what the farm has produced during the year. It is no easy matter to charge this all on the books. How much, for instance, shall the family pay for its drive to church in the carriage which is exclusively a pleasure vehicle, and behind the team which is used steadily for work purposes? No doubt such difficulties can be worked out in any individual case by common-sense rules which are not too complicated to apply. But also, no doubt, many of the figures which have been given to the public in the past concerning farmers' incomes and costs of production have failed to make just such allowances.

A. Production Records

121. INDIVIDUAL PERFORMANCE OF DAIRY COWS[1]

By CLARENCE B. LANE

The condition of the farm industry as seen on the average farm points to the need of better business methods and more definite knowledge of the sources of profit or loss. In no department connected with the farm is there more need for absolute data than in the

[1] Adapted from *Bulletin 75, Bureau of Animal Industry, United States Department of Agriculture*, pp. 9–14, 45, 49.

dairy. The records of progressive and unprogressive dairymen indicate that there is no business which shows a greater range of profit than that of dairy farming. Investigations of creamery patrons illustrate this most strikingly and show that one dairyman frequently makes double the profits of his neighbors. In an investigation of the records of 100 creamery patrons, conducted by *Hoard's Dairyman*, it was shown that one of them made $2.30 for every dollar invested in feed for his cows, while a neighbor made $1.00 and another but 50 cents. All had the same soil and the same market. Thirty-eight out of the hundred kept cows at an actual loss.

This bulletin aims to show dairymen the importance of keeping records complete enough to give the dairy performance of every cow in the herd, thereby making it possible to weed out the unprofitable animals. With the application of the scales and the Babcock test this can be done, and both production and profits greatly increased. A record is also of great help to the feeder. If he knows exactly what a cow is doing he can prepare the ration accordingly, and often feed more economically. Records at the Michigan Experiment Station showed that the profit on the milk from different cows varied from $6.08 to $94.05.

Experience has shown that, while farmers know in a general way which are the good milkers in their herds, they are likely to be seriously mistaken in many cases unless actual records are kept. For example, a well-known dairyman and his two sons prepared a list of what they considered their best half-dozen cows. He had handled every one of these cows from its birth and he and his sons did the milking. After keeping actual records for a year, he found the cow they had put first on their list stood fourth and the one they had put in fifth place stood first. In second place came a cow he had not had on his merit list at all; the third was his fourth; the fourth, his first; fifth, his sixth; and sixth another not on his merit list. His second and third were still lower down the list as actual performers.

Accurate and continuous records are necessary for best results. While daily records are best, various investigators have recommended methods of estimating the yearly production from a few weighings and tests, a number of which methods have proved practical and reasonably accurate. For example: The Wisconsin Experiment Station recommends weighing and sampling the milk one day each week during the year; and the Illinois station suggests weighing and

sampling each cow's milk for fourteen consecutive milkings every seventh week. Two types of record are illustrated below.

YIELD OF MILK JULY 30, P.M., TO AUGUST 6, A.M.

Number of Milking	Spotty	Black No. 1	Black No. 2	Bottle	Milly	Little Lamie	Alice
1.....	20.5	14.1	11.3	15.0	15.4	10.9	6.9
2.....	13.5	6.8	6.5	10.2	13.2	8.3	5.2
3.....	22.2	16.8	11.7	15.0	17.0	11.0	6.7
4.....	14.2	5.2	8.2	10.7	14.2	8.5	5.2
5.....	20.3	15.7	6.0	13.7	16.3	10.7	6.8
6.....	16.7	7.0	9.2	11.9	15.6	9.5	5.1
7.....	18.5	15.5	4.7	14.1	16.7	9.6	7.0
8.....	16.0	7.8	7.3	11.2	14.4	8.7	5.0
9.....	22.0	14.5	13.5	16.4	18.5	10.7	6.9
10.....	14.0	9.5	6.9	10.5	15.0	8.3	4.8
11.....	19.9	9.8	4.0	12.9	17.5	11.0	6.7
12.....	14.5	13.0	6.8	11.5	14.5	8.1	4.4
13.....	22.6	13.2	6.7	16.1	18.4	11.6	8.6
14.....	15.4	7.1	8.8	11.3	14.7	8.6	4.3
Total....	250.3	156.0	111.6	180.5	221.4	135.5	83.6
Fat—per cent	3.2	2.8	3.2	3.5	3.2	3.4	4.6
Fat—pounds.	8.00	4.36	3.57	6.31	7 08	4.60	3.84

ONE COW'S RECORD AT SEVEN-WEEK INTERVALS

Week Ending	Milk Pounds	Fat Per Cent	Fat Pounds	Butter Pounds
March 31.....	192.4	3.2	6.16	7.18
May 19.....	142.4	4.3	6.12	7.14
July 7.....	84.3	4.0	3.37	3.93
August 25.....	7.0	6.9	.48	.56

122. CHECKING UP THE POULTRY PLANT[1]

By G. M. GOWELL

It was found in practice that, with the most careful selection, we were including in our breeding pens birds that were not great producers, and that it was a prime necessity to ascertain the exact record

[1] Adapted from *Annual Report of the Maine Agricultural Experiment Station*, 1900, pp. 97–99; 1903, p. 70. It is true that the breeding experiments based upon this method did not have the results expected. But whatever the final conclusion of that controversy, the value of records of actual performance, as a basis of weeding out the unprofitable and continuing the profitable birds, cannot be doubted.—EDITOR.

of the eggs produced by each individual. With the most careful selection we could make, when estimating the capacities for egg yielding by the type and forms of birds, we found we were still including hens that were small workers. Many of these light layers gave evidence of much vitality, and in many instances there were no marked differences in form and action by which we were able to account for the small amount of work performed by them.

In 1898, therefore, a trap-nest was devised, by which we could secure a record of the actual performance of each bird. Only by the use of such nest boxes and records could we hope to control our work. Of 236 hens tested the first year, 39 laid 160 or more eggs and 35 laid less than 100 each. A sample of the record is shown below.

Number of Hen	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
101			18	15	21	21	24	21	17	26	17	21	3		204
36		15	9	23	23	19	16	21	19	13	15	8	20		201
7	19	11	19	19	23	16	16	14	14	17	21				189
154			5	12	20	21	22	22	18	21	18	1			160
41		16	3					19	8	6					52
234				9	17		6	4							36

Such records also show at what time of the year the eggs of any given hen were produced and, therefore, their relative value. It is apparent that the summer layer is not as valuable as the hen that produces a large share of her eggs when prices are high.

B. Capital Accounts

123. THE YOUNG FARMER'S NEED OF A YEARLY BUSINESS INVENTORY[1]

The young farmer who is endeavoring to build up a more efficient and profitable business seldom retains much cash. When money is received he buys a new implement, another animal, improves a building, or makes payments on bills for things bought on credit. During the course of the year he may receive and pay out large sums of money, leaving almost no cash at the end of the year. The annual returns may seem to have been only a fair living for himself and family, whereas the farm business may have turned a good profit,

[1] From *Weekly News Letter to Crop Correspondents, United States Department of Agriculture*, March 10, 1915.

which was invested from month to month. Hence it is important for the farmer's guidance and encouragement that he make an annual inventory of his farm investments. This inventory should be a detailed list, with values, of everything used in the farm business, including land, buildings, live stock, machinery and tools, produce for feed or sale, supplies, bills receivable, and cash; also a list of all accounts and bills owing. The difference between the total assets and debts shows the net farm worth.

A study of two successive inventories of a farm in New York state illustrates how one young farmer on 100 acres prospered regardless of the fact that he had almost no cash at the end of the year. The total assets at the beginning of the year amounted to $13,090 and to $13,400 at the end of the same year, an increase of $310. The increased investment in live stock, machinery, and tools, and more produce held for sale amounted to $1,073, but this was partially offset by the cash decrease of $763. The farm indebtedness was also reduced by $253, thus making a total increase in net worth to the farm business of $563. The inventory values covered all depreciations and increases in values, so that this $563 was net increase in the value of the farm investment. It means that this sum was saved from the year's business after all farm expenses had been paid, including interest on borrowed money and all living expenses. The amount of cash at the end of the year, $133, proved to be no indication of the success of the year's business.

124. MAKING THE INVENTORY[1]

By FRED W. CARD

The farm inventory should include all property, of whatever description, which the farmer may possess. A better record of the business situation can be obtained by keeping the inventory of the land itself separate from that of the buildings and other improvements. In considering these improvements the point is quickly reached where it becomes a question what to consider as investment and what to look upon as an operating expense. Fencing is properly a farm expense, and under average running conditions may as well be so considered at once. Yet in taking hold of a run-down farm, where a heavy outlay for fencing may be needed all at once, a portion of the

[1] Adapted from *Farm Management*, pp. 150–56. (Copyright by Doubleday, Page & Co.)

cost may well appear in the inventory, to be charged off gradually, thereby giving a more just account of the operations of each year.

Orchards afford a puzzling problem. There can be no questioning the fact that a well-grown apple orchard adds materially to the value of a farm. The same applies to a peach orchard in much less degree, for the peach tree is short-lived and uncertain. Carrying the consideration down through the line of bush fruits, strawberries, etc., to a growing crop like a field of grass or winter rye, it is hard to draw the line where assets shall leave off and mere expense begin. Then, too, it is difficult to know what value to place upon a young, growing orchard. Probably the wisest plan is to add the yearly cost of care to the original cost of trees and planting. It is doubtless safer to take the conservative ground of treating all growing crops as an expense. It may be preferred to carry this even to the orchard, aiming to utilize the land as it grows in such a way as to pay the expense of care and management. This is surely better than an overvaluation, though not entirely fair to the farm, for a good orchard will add materially to its income-producing power and hence to its value. To place a value upon increased fertility and productiveness of soil is likewise a very difficult thing to do. A farmer may easily deceive himself by overestimating this factor. Yet while seemingly too intangible to find a place in the inventory, it is one of the most important factors in the income-producing power of the farm.

The farm dwelling offers a somewhat peculiar problem, since, except in so far as portions of it may be used for some farm operation, like dairy work, it is not a part of the farm business. The merchant or manufacturer does not think of including his home in his business inventory and asking the business to bear the interest and depreciation upon it. The maintenance of his home is a personal expense, which may be heavy or light as he chooses, and which has nothing whatever to do with the conduct of his business. Whether the farmer lives in a house worth one thousand or ten thousand dollars need have nothing to do with the outcome of the farm business itself, but it will materially affect the showing if the expense of maintenance be charged to the farm improperly.

Few farmers will care to keep two sets of books, one for personal accounts and one for farm accounts; yet both are important. Most men will prefer to separate personal expenses from farm expenses in the same set of books. It may, therefore, be desirable to include the dwelling in the inventory as well as all other forms of property which

the owner possesses, even though they may have no connection with the farm business. If repairs and other expenses connected with the dwelling are charged to the farm, an allowance for rental is likewise due if a proper showing is to be made.

Notes, personal accounts, money in bank, and cash on hand are forms of property, which, strictly speaking, may not belong to the inventory, since they are neither stock nor equipment, but for the sake of simplicity it is well to include all assets, of whatever description.

Deducting the total liabilities from the total assets gives the "net worth." This is the important item to secure. A comparison of this net worth from year to year shows the financial outcome of the business.

Fixing the inventory values is a matter of great importance, requiring good judgment and careful thought. Three general methods of estimating values present themselves. The implement may be inventoried at cost, at its selling value, or at its value for service. To value an article at cost is misleading. As time goes on the business becomes bolstered up with fictitious values which make it appear to have paid better than it really has. To inventory at the selling value of an article may be equally unfair. As soon as a tool is put to use its value for sale drops far out of proportion to its value for service. It is unfair to charge the farm with this large decrease, for the tool is not merchandise; it was not bought to be sold again. If it were worth the price paid it is still worth approximately the same amount, lessened by actual wear or injury, provided the cost of replacing it remains the same. Value for service is the chief factor in determining the inventory value, though neither the cost nor the selling value can be entirely disregarded. In determining this value several factors need to be considered. First among these is the probable length of service of the article. If it may reasonably be expected to last for ten years, under the conditions in which it is used, its value will decrease 10 per cent each year. However, if the service rendered in the tenth year of its use will be much less efficient than in the first year, its value at the beginning of that year is less than one-tenth of the original cost.

Likewise the cost of replacing an article may be an important factor in determining value. It is manifestly unfair to place value on an article greater than the cost of replacing it. Also, the invention of a better tool for doing the work may destroy the value of a machine

long before it is worn out. This is a frequent occurrence in manufacturing life, but less common in agriculture.

125. THE DEPRECIATION ACCOUNT[1]

By E. H. THOMPSON and H. M. DIXON

In addition to the current farm expenses there are certain other items, such as depreciation, which may be called fixed charges. These occur on all farms to a greater or less extent. Buildings may be constructed so that they will last for one hundred years, or they may have to be rebuilt every twenty-five or thirty years. The life of machinery depends on the care given and the extent to which it is used. Although there is no appreciable expense each year, these buildings and machines eventually have to be replaced. It is proper that a proportionate share of this replacement cost should be charged against the farm each year; otherwise, whenever a new barn or dwelling is built the entire cost of this building would have to be charged against the business for that particular year. Depreciation charges, therefore, are merely a method of uniformly distributing these costs over the period of years that they are in use.

The annual depreciation on buildings will vary from less than 1 per cent on very substantial stone or brick buildings to as high as 3 or 4 per cent on frame buildings. The rate of depreciation on machinery will vary from 5 to 20 per cent, depending on the implement and the way it is used. Probably from 7 to 12 per cent a year would be approximately correct for most farms. The amount of depreciation that should be charged each year as an expense is left to the judgment of the person making the record. No set rules can be given, as no two farms are exactly alike in this respect.

C. Financial Records of the Farm as a Whole

126. HOW THE OFFICE OF FARM MANAGEMENT ANALYZES THE FARM BUSINESS[2]

By E. H. THOMPSON and H. M. DIXON

Experience shows that it is not possible to distinguish profitable farms by casual observation. Where a farmer is operating a large business, even a low rate of interest without any wages for him-

[1] Adapted from *Farmers' Bulletin 661*, p. 6. See also selections 93 and 95, in chapter v.

[2] Adapted from *Farmers' Bulletin 661*, pp. 1, 2, 9, 19–26.

self would bring in sufficient funds to give a prosperous appearance to the farm. But a farm cannot properly be called successful unless it pays a fair rate of interest on the investment, returns fair wages for the farmer's labor, and maintains at the same time the fertility of the soil. A better realization of the fact that the farm is a complex business subject to certain economic laws is one of the greatest benefits to be derived from such a study as is outlined in this bulletin.

Farmers already know that the gain from a big business should be more than from a small one, that good cows are more profitable than poor ones, and that good crops are more desirable than those which do not pay for harvesting. The real difficulty is that the farmer has had no convenient way of measuring just how good or how poor his business really was, i.e., he has had no way of measuring its efficiency. With the facts that are made available by such an analysis as is here provided, he can more readily find the strong and the weak points in his system of management and thus make improvements with some confidence in the results.

Many of the items to be recorded may appear to be rough estimates, but those who undertake studies of this kind on a large scale will be surprised to find how intimately most farmers know the details of their business when it is analyzed into the elements that correspond to the terms in which the farmer thinks when studying his business. A farmer may not know offhand what his total farm income is, but he does know with considerable accuracy the facts necessary to determine this income. It is important also to remember that the final result of the analysis of a farm business is determined mainly by a few large items which the farmer does know quite accurately. Variations in the numerous small items are as likely to be above as below the correct values and hence tend to balance each other. A variation of a few dollars in the final result is not a matter of great importance and would not seriously affect the conclusions.

The problem of farm accounting is not a question of a particular kind of form or blank, but of knowing what accounts to keep and what use to make of them. The method of farm analysis given in this bulletin is that which has been used in the Office of Farm Management for a number of years in the study of the business of farming. A crop record and a live-stock record should be kept and summarized in a form like that shown on pp. 386–88.

CROP RECORD

Crops		Yield		Operator's Sales			Landlord's Sales		
Kind	Acres	Per Acre	Total	Amount	Price	Value	Amount	Price	Value
Corn for grain									
Corn for silage									
Other corn									
Potatoes									
Hay									
Alfalfa									
Spring wheat									
Winter wheat									
Rye									
Oats									
Barley									
Buckwheat									
Straw									
Etc.									

LIVE-STOCK RECORD

OPERATOR'S STOCK

Animals—Kind	Beginning of Farm Year			End of Farm Year			Sales			Purchases			Died
	No.	Value	Total	No.	Value	Total	No.	Value	Total	No.	Value	Total	No.
Cows													
Heifers													
Calves													
Bulls													
Steers													
Oxen													
Horses													
Mules													
Colts													
Ewes													
Lambs													
Brood sows													
Other hogs													
Pigs													
Chickens													
Turkeys													
Ducks													
Bees													
Total													

RECEIPTS FROM STOCK PRODUCTS

	Amount	Price	Operator	Landlord
Butter				
Creamery milk				
Market milk				
Cheese				
Wool				
Eggs				
Hides				
Honey				
Breeding fees				
Total				

LIVE-STOCK SUMMARY

	Operator		Landlord	
Stock products				
Stock sold				
Value of live stock at end of year				
Total	→		→	
Live stock purchased				
Value of live stock at beginning of year				
Total	→		→	
Live stock, net increase				

If there are receipts from other sources, such as cash labor, machine work, or sale of timber products, they should have a separate account. An inventory must be kept of all farm property—buildings, machinery, feed, and supplies, and record made of all improvements, such as new buildings, fences, or machinery. On the other hand, there must be a charge for depreciation which has occurred during the year in the value of equipment and buildings. An accurate account of current expenses must, of course, be kept at all times. Memorandum records of such items may be transferred to the following summary account:

CURRENT EXPENSES

	Operator	Landlord
Regular hired labor.....mo..		
Extra hired labor.....mo..		
Board hired labor.....mo..		
Family labor.....mo..		
Board of family labor		
Repair of machinery		
Repair of buildings		
Repair of fences		
Feed: Hay, silage, etc		
Feed: Grain and concentrates		
Feed grinding		
Silo filling		
Corn shredding		
Milk hauling		
Horseshoeing		
Breeding fees		
Veterinary		
Seed, plants, trees		
Fertilizer, manure		
Spray materials		
Twine		
Thrashing		
Baling		
Machine work hired		
Fuel and oil for farm work		
Bags, barrels, crates		
Cotton ginning		
Insurance		
Taxes on farm property		
Water tax		
Cash rent		
Total		

Finally, in order to get a bird's-eye view of the whole result of the year's operations, showing return upon investment and labor income, the following general summary is made. "Capital" here means the total of real estate, live stock, machinery, feed, and supplies, and cash on hand at the beginning of the farm year—the investment on which interest should be charged.

The labor income represents the amount of money the farmer has left after paying all business expenses of the farm and deducting interest on the money invested in the farm business. In addition to the labor income the farmer has the use of the farmhouse and the products that are furnished by the farm toward his living, such as fruit, garden vegetables, dairy products, and fuel. In other words,

the labor income is comparable with a hired man's wages when the hired man gets a house and garden and some farm products.

SUMMARY

	Operator		Landlord	
	Item	Total	Item	Total
Capital	→		→	
Receipts from:				
Page 19, Crop sales				
Page 22, Live-stock, net increase				
Page 22, Miscellaneous				
Page 24, Increase feed and supplies				
Total receipts	→		→	
Expenses:				
Page 23, Current				
Page 23, Depreciation				
Page 24, Decrease in feed				
Total expenses	→		→	
Farm income				
Interest on capital, per cent*			Per cent received on investment	
Farmer's labor income				

* Use current rate of interest on well-secured farm loans.

The difference between receipts and expenses, or farm income, will not necessarily correspond to the money on hand or in the bank, as personal and living expenses have to be paid out of this amount. Furthermore, in the case of farmers having mortgages or other debts, the interest on these, as well as any principal paid, must come out of the farm income. Therefore, the record of the farm business may show a fairly large difference between the receipts and expenses, and yet the farmer may not have any money to show for it at the end of the year, owing to the fact that the funds have been spent for living or for personal uses or have been put into other investments, such as insurance and paying off the mortgage. The object of this record is to analyze the farm business; that is, to ascertain how much the farmer makes, not to determine how much he actually saves. Having learned what the farm is returning, the responsibility rests with the farmer as to how much he spends personally or uses in other ways.

127. AN ILLINOIS SYSTEM OF ACCOUNTS[1]

Four things must be known in order to have a fairly accurate record of a farm business for any one year. These are as follows:

1. The value of the real estate, stock, feed, grain, supplies, and machinery at the first of the year as determined by careful inventory.

2. The total farm receipts[2] for the year.

3. The total farm expenses[3] for the year.

4. The value of real estate, stock, feed, grain, supplies, and machinery at the end of the year as determined by another inventory.

A summary of the information contained in such a record will enable the farmer to determine the financial result of the farm business for the year.

The net farm income, as used here, is the income received from the use of capital invested and the labor performed by the operator of the farm after deducting all of the other expenses of the farm business. This net farm income varies from year to year, depending on the management of the farm and on such factors as variation in seasons, fluctuation in prices, diseases among live stock, etc. These are conditions over which the farmer has little or no control.

Man labor has quite a definite value at farm work when no capital is invested. For instance, in Illinois the single farm hand receives from $300 to $450 and board annually. In the case of the married man, the cash wage is about the same and in addition to this he usually receives house rent, use of garden, use of a cow, and other miscellaneous items, which make his real wages about the same as those paid the single man. This represents only the labor wage of a man on the farm and is no measure of his ability to operate a farm.

The farm operator, as compared with the hired man, has an opportunity to demonstrate his ability to manage a business with considerable capital. Since his labor has quite a definite value and the farm earnings vary from year to year, the man's value as a manager is hard to determine. When the interest at the usual rate

[1] From the Farm Account Book prepared for the Champaign County Agricultural Improvement Association by the Extension Division of the College of Agriculture, University of Illinois.

[2] The term "total farm receipts," as used here, means the total income from the farm for the year; that is, it includes all cash receipts from the farm and the increase in value of improvements, live stock, grain, supplies, machinery, and other farm equipment.

[3] The term "total farm expenses," as used here, means the total cost of the farm business for the year; that is, it includes all cash expenses of the farm, the decrease in value of improvements, live stock, feed, supplies, tools, machinery, and the value of the unpaid family labor not including the operator's wages.

on the capital invested in the farm business is greater than the ordinary wages a man can earn as a farm laborer, the interest earned on the investment is the best measure of a man's ability to manage a farm. For example, the investment represented by the majority of the farms in this section at ordinary rates (5 per cent, for example) amounts to $1,500 to $3,000 annually and the farmer's wages as a laborer amount to only about $500. The rate of interest earned is, therefore, ordinarily the item of most importance in determining the success of the farm business. In any event, the ordinary farmer in this region is accustomed to thinking in terms of the rate of interest earned on the investment as do most other business men with large investments.

INVENTORY OF REAL ESTATE AT THE BEGINNING OF THE YEAR

	Number of Acres	Value per Acre	Total Value
Total value of land, including value of buildings			

LIST VALUE OF FARM IMPROVEMENTS HERE

Kind of Improvement	Value at Beginning of Year	Value at End Year
Dwelling-house		
Other houses		
Barn		
Corn crib		
Granary		
Hog house		
Hen house		
Machine shed		
Other permanent improvements		
Fencing		
Tiling		
Phosphate		
Limestone		
Totals		
Place smaller total under larger		
Difference shows	Decrease	Increase

INVENTORY OF REAL ESTATE AT THE END OF THE YEAR

	Number of Acres	Value per Acre	Total Value
Total value of land, including value of bulidings			

The difference in the value of a building or other improvement at the beginning and end of the year should take into account any decrease in value due to the year's use, and any increase in value due to repairing or renewals. For example, if we estimated that a barn, valued at $1,500 at the beginning of the year, would usually last twenty-five years, the rate of depreciation would be 4 per cent (or $60) for the year's use. The value at the end of the year would then be put down as $1,440. If during the year more than the normal amount of repairs have been put on the barn, say $100 worth, the value at the end of the year would be put at $1,540. If new buildings have been put up during the year, the inventory would be increased by the value of such improvements.

In the case of limestone applied, the cost of limestone should be charged off over four or five years, that is, $100 worth of limestone should show a decrease in value of $20 to $25 a year in the inventory. In the case of phosphates, the removal of twenty average crops of grain will remove only about as much phosphorus from an acre as is contained in one-half ton of rock phosphate, so it may be considered a permanent improvement for this purpose.

The inventory value for the land itself should not be changed from year to year only in so far as new permanent improvements have been added, such as ditching, tiling, fencing, etc.

[This is followed by a separate inventory and cash account for each of the classes of stock—horses, cattle, hogs, sheep, and poultry. These accounts are then summarized to show net increase or decrease for each class and for all live stock. Then come inventories of machinery and of feed, grain, and supplies, followed by a record of crop sales and miscellaneous receipts. The expense accounts are kept under several separate heads, as shown in the summary which follows:]

SUMMARY OF ALL EXPENSES

Account		Total Amounts	
Permanent improvements	Page 23		
Live stock	Page 24		
Crops	Page 25		
Feeds purchased	Page 26		
Machinery	Page 27		
Hired labor	Page 28		
Rent, taxes, and insurance	Page 29		
Miscellaneous	Pages29–30		
Total farm cash expenses			

[In contrast to the method of the United States Department of Agriculture it is worth noticing that the account for permanent

improvements includes outlays for "new buildings, building repairs, new fences, fence repairs, drains, paint, phosphate, limestone, etc." Also there is an account provided for the "value of family labor (not paid in cash)." This does not include the value of the operator's own labor, but does include an estimate of the cash cost of board of the other family workers.

The whole record is then brought together in the following summary:]

SUMMARY OF THE YEAR'S FARM BUSINESS

No.		Total Farm	Tenant's Share	Landlord's Share
	CAPITAL AT THE BEGINNING OF THE YEAR			
1	Real estate Page 3			
2	Live stock Page 15			
3	Machinery Page 17			
4	Feed, grain, and supplies Page 20			
5	Total capital			
	FARM RECEIPTS			
6	Increase in value of real estate Page 3			
7	Net increase from live stock Page 15			
8	Increase in value of machinery Page 17			
9	Increase in value of feed, grain, and supplies Page 20			
10	Crop sales Page 21			
11	Miscellaneous receipts Page 22			
12	Total receipts			
	FARM EXPENSES			
13	Decrease in value of real estate Page 3			
14	Net decrease from live stock Page 15			
15	Decrease in value of machinery Page 17			
16	Decrease in value of feed, grain, and supplies Page 20			
17	Current expenses, total Page 30			
18	Value of unpaid family labor Page 31			
19	Total expenses			
20	Receipts less expenses (net farm income)			
21	Estimated value of operator's labor			
22	Net farm income less value of operator's labor (income from use of capital)			
23	Rate of interest earned on capital			

D. Comparison of Results

128. THE DEADLY PARALLEL COLUMN[1]

The following chart shows the average results obtained on twenty farms in Champaign County for the year of 1915. These farms were the best twenty out of eighty, as measured by the interest they paid

	Average of Twenty Better Farms	Your Farm
Total capital	$53,026.00	
Working capital*	4,248.00	
Total acres	217.00	
Acres in crops	188.00	
Working capital per acre	19.55	
Gross receipts	5,890.00	
Expenses (cash, family labor, and depreciation)	1,704.00	
Net receipts	4,186.00	
Interest on investment	7.89%	
Net receipts per acre	17.68	
Diversity of business		
†Receipts: Corn	$2,616.00	
Oats	1,625.00	
Wheat	434.00	
Horses	123.00	
Cattle	183.00	
Dairy products	313.00	
Hogs	345.00	
Poultry	140.00	
	Acres Yield	
Quality of business		
Yields of: Corn	98.9 53.9	
Oats	65.9 63.1	
Wheat	13.6 32.8	
Clover and timothy	6.3 1.8T	
Alfalfa	1.4 4 T	
Labor		
Crop acres per man	87	
Crop acres per horse	21.2	

* Working capital includes the investment in all live stock, machinery, and feeds.

† The prices allowed on grain were the actual prices received for grain that had been sold, and for the grains on hand $0.60 per bushel for corn, $0.35 for oats, and $1.00 for wheat was allowed, which were the actual grain prices at the time the records were secured.

[1] From Farm Account Book, Extension Division, College of Agriculture, University of Illinois

on the total farm investment. The blank column headed "Your Farm" may be used to compare the results from your own farm with what other farmers did under the same general conditions.

At the end of the year we hope to be able to provide you with similar statements for 1916 for a greater number of farms than here represented, and for various sections of the state. These figures will have increasing value as they include more years, since they will tend to overcome the seasonal variation of any one year.

129. SOME TESTS OF FARM EFFICIENCY[1]

Number of crop acres per work horse.....
Number of months of man labor, including operator's.
Number of man-labor years[2].....
Number of crop acres per man[2].....
Percentage of total investment in real estate.....
Investment in buildings per crop acre.....
Number of animal units[3].....
Investment in barns per animal unit.....
Number of productive man-work units[4].....
Number of productive man-work units per man.....
Man-labor cost per productive work unit[5].....
Net receipts per animal unit[6].....
Value of feed consumed per animal unit[7].....
Milk receipts per cow.....

[1] Divide number of months of man-labor by 12.

[2] Divide number of crop acres by number of man-labor years.

[3] In figuring the amount of live stock on the farm, it is necessary to have some basis for comparing the different kinds of animals. One horse, cow, or steer is equivalent to one animal unit; two head of young stock (of the above kinds) are counted as one animal unit; 7 sheep, 14 lambs, 5 hogs, 10 pigs, or 100 chickens are each counted as one animal unit.

[4] In order to compute the time required for different farm operations, a normal day's labor of 10 hours is considered a work unit. See Table I, p. 397.

[5] Find the cost of all farm labor, including value of operator's, and divide by the number of man-work units.

[6] Divide the net increase under live-stock summary by the number of animal units, not including work horses.

[7] Find the total at farm prices of the value of all crops fed, plus a charge for pasture, plus amount of feed bought, and plus or minus the difference in the feed inventory, and divide by the number of animal units.

Note

Efficiency of labor.—There are but few standards of farm labor, few measures of how much work a man should do in a day. Generally the worker must be his own boss and must set his own pace. He must also work under most adverse weather conditions at certain times. It is perfectly evident that innumerable factors will influence the time required for most operations. They cannot be standardized as work is in a factory. Some men are naturally slow and take twice as much time as others to do certain kinds of farm work. There has

[1] From *Farmers' Bulletin 661*, pp. 12, 13, 26.

been considerable investigation of this subject, but not enough to give reliable standards of farm labor for all conditions. Table I gives approximate standards for average conditions for certain classes of work. These, or such modifications of them as local experience may render advisable, may be used in working out the approximate amount of both man and horse labor required to operate a given farm.

TABLE I

APPROXIMATE WORK UNITS NEEDED FOR THE PRODUCTION OF CROPS AND IN CARING FOR LIVE STOCK, ETC., A WORK UNIT BEING A 10-HOUR DAY OF MAN OR HORSE LABOR

OPERATION	WORK UNITS (10-HOUR DAYS)	
	Man	Horse
Production of crops (per acre):		
Timothy, alfalfa, and clover hay, per cutting	1	1
Oats, wheat, barley, rye, buckwheat, and millet	2	3
Corn husked from standing stalks, Corn Belt states	2 to 3	5
Corn husked from shock	6	6
Corn for silo	4 to 6	5 to 7
Corn husked, southern states	3 to 4	3 to 4
Potatoes	8 to 12	10
Cotton	8 to 12	4 to 6
Sugar beets	7	7
Melons	4	2
Cabbage	13	12
Peanuts	3	1
Sorghum sown broadcast, cut for hay	4	4
Tobacco	20	7
Field beans	5	5
Apples	15	5
Caring for live stock (per year):		
Horses, Corn Belt states	8	$\frac{1}{2}$
Horses, eastern states	12	$\frac{1}{2}$
Dairy cows	15 to 20	1 to 2
Young stock, cattle, colts, etc	$2\frac{1}{2}$ to 3	$\frac{1}{10}$
Ten hogs, Corn Belt states	10	2
Ten hogs, eastern states	20	2
Ten brood sows and raising pigs to weaning	30	5
100 ewes	50	5
100 chickens (well cared for)	15 to 25	1

RECEIPTS FROM LIVE STOCK

The importance of having efficient live stock is well understood. By efficient animals is meant those that will more than pay for the cost of keeping. On the majority of farms, except in the southern and certain of the western states, more of the crops are fed to live stock than are sold direct. In fact, on many farms none of the

feedable crops are sold. The animals are then the market, and the price they return for these crops is measured by their efficiency. The best of corn crops and hay count for little when sold to animals that return much below market prices for them.

E. Cost Accounting

130. THE ACCOUNTING METHOD OF STUDYING THE FARM ENTERPRISE[1]

By H. C. TAYLOR

Cost accounting is a method of ascertaining such facts regarding the operation and results of a business as will enable the operator to know what to produce and how to produce it in order to secure maximum profits from the business. The data secured by this method may have some general value, but its primary purpose is to give a basis for more intelligent direction of the operations of the factory or the farm for which the accounts are kept.

The one who plans the records and their tabulation must have a clear vision of economic forces if he would plan a successful system of accounts, for economic forces determine what should be done on the farm. The system of accounts must show quantitatively the workings of these forces at a given time and place.

In agricultural accounting, the first problem is to contrive a system of records which will show what to produce. This problem is more complex in farming than in almost any other business. In very few districts does the farmer devote himself exclusively to one enterprise. This is not due to any peculiar characteristics of the men engaged in the business, but is inherent in the natural conditions under which crops must be grown. There are more or less definite times when planting, harvesting, etc., must be done, and it is rarely found that one enterprise, such as wheat growing or corn growing, occupies all the farmer's time.

The problem of first importance in the organization of a farm for profits is that of correlating a group of enterprises upon one farm in such a manner as will keep the labor and equipments employed as nearly continuously as practical, and in that enterprise which will yield the largest returns of all those which can be carried on at the given time of year.

[1] From *Research Bulletin 16, Wisconsin Agricultural Experiment Station.*

It is a matter of common knowledge that the production of a crop of corn does not require labor continuously throughout the year. The same is true of oats, and it happens that the nature of these plants is such that oats can and must be sown earlier than corn, and that oats require no further attention until after the corn has been planted and cultivated. The harvesting and thrashing of the oats are or can be over before the corn is ready to be harvested. These crops are, for these reasons, said to be *complementary* (compare Figs. 15 and 18).

Corn is not the only crop which requires attention at the given time of year. In some regions, tobacco and corn are both open to the farmer's choice. In some places the sugar beet is an alternative; in others, cotton. Likewise, the farmer has a choice of several crops in the seasons when oats are sown and harvested. Barley and spring wheat will suggest themselves as alternatives to oats in certain regions. The crops which require attention at the same time of year are said to be *competitive* (Figs. 18 and 19).

It is obviously to the farmer's interest that he select from each group of competing crops the one which will add most to his net income. It is equally clear that he will desire to combine as many complementary enterprises as will add to the profitableness of the business as a whole.

The problem the accountant has before him is the planning of such records as will show the way in which the various complementary enterprises fit together to fill out the year's employment, and such records as will enable him to show the relative profitableness of each of the competing enterprises.

To secure these results a labor record is a necessity. A labor record showing the exact distribution of all man and horse labor employed each day in the year gives the material for a chart which will show the time employed in each enterprise. The charts for the various enterprises on one farm will show the complementary character of certain crops, and the charts for a series of farms in the same locality on some of which the one, on some the other, of a group of competing crops are being grown, the competitive character of certain crops can be shown.

It is necessary to know what was done and what might have been done in order to judge the merits of the management. A labor record may show the hired man was cutting wood on a given forenoon in June. If supplementary data show the land was too wet to be

cultivated and that the clover was not ready to be cut, etc., it may prove to be true that cutting wood was the most profitable work the laborer could be doing. If, however, in July the records show a

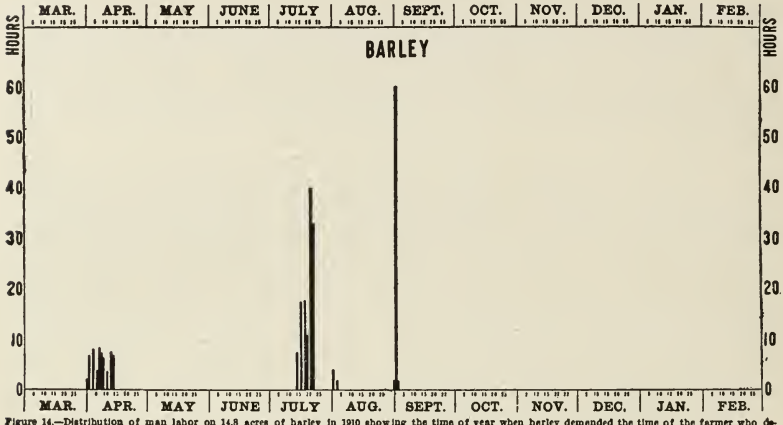


Figure 14.—Distribution of man labor on 14.8 acres of barley in 1910 showing the time of year when barley demanded the time of the farmer who devoted 17.4 hours of man labor per acre to its production. The profit per acre was $13.05 and the profit per hour of man labor 75 cents.

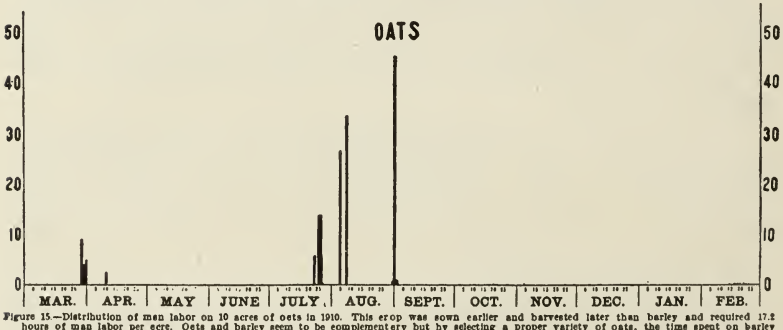


Figure 15.—Distribution of men labor on 10 acres of oats in 1910. This crop was sown earlier and harvested later than barley and required 17.2 hours of man labor per acre. Oats and barley seem to be complementary but by selecting a proper variety of oats, the time spent on barley might be devoted to oats. A profit of $15.04 per acre or 88 cents per hour of men labor was made on this crop.

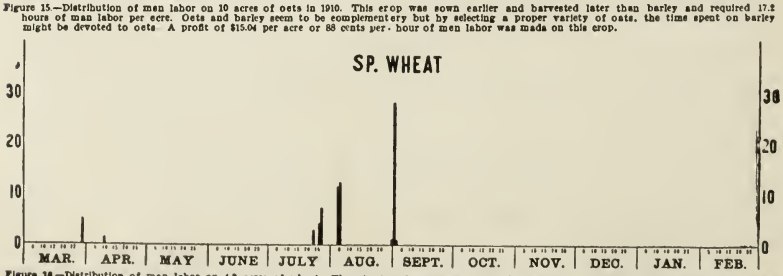


Figure 16.—Distribution of man labor on 4.3 acres of wheat. The wheat and oats were sown, harvested and threshed at the same time of year and are clearly competitive. Wheat required 17.3 hours of man labor per acre and gave a profit of $21 per acre or $1.21 per hour of man labor.

half-day spent in repairing a binder preliminary to commencing grain harvest, which time might have been employed in cultivating corn, or in harvesting hay or grain, the student of the problem of farm

management will have a right to question the wisdom of cutting wood that day in June which might have been used in repairing the binder and thus resulted in the saving of valuable time in July.

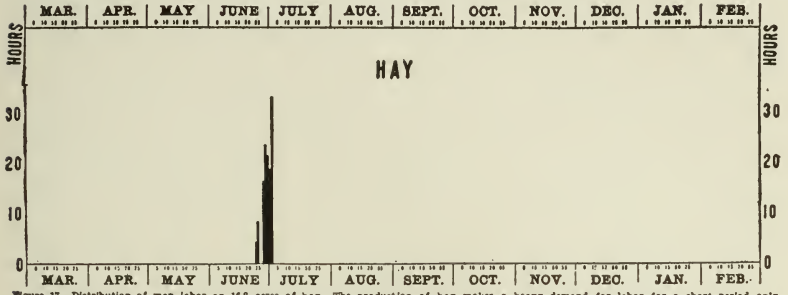


Figure 17.—Distribution of man labor on 16.8 acres of hay. The production of hay makes a heavy demand for labor for a short period only. Fortunately this demand comes before small grain harvest and at a time when the corn is large enough to be cultivated rapidly. The hay on the farm under consideration required 7.6 hours of man labor per acre and gave a profit of $14.75 per acre or $1.94 per hour of man labor.

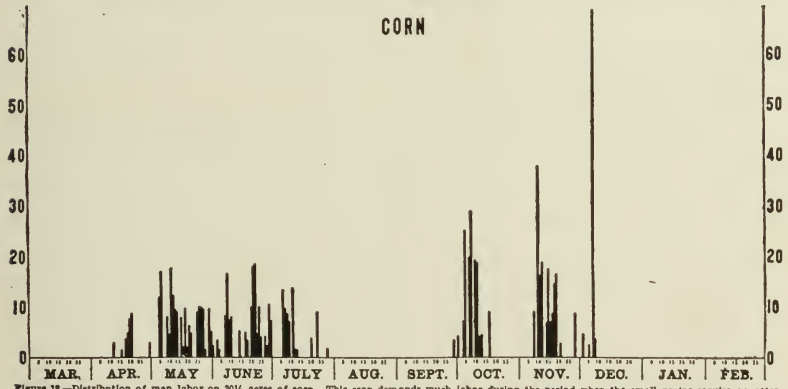


Figure 18.—Distribution of man labor on 30½ acres of corn. This crop demands much labor during the period when the small grains require no attention but competes with tobacco for labor during the period of planting and cultivation. This field demanded 55.1 hours of man labor and gave a profit of $6.86 per acre or 29 cents per hour of man labor.

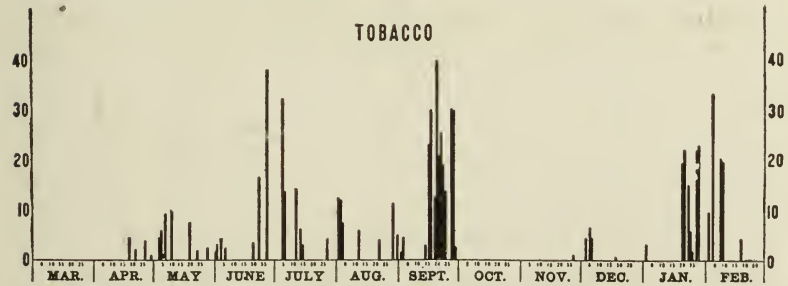


Figure 19.—Distribution of man labor on 3¾ acres of tobacco. Tobacco required labor at times which conflicted with corn during the season of cultivation but on the other hand it made large demands for labor at times when other crops demand no attention. On this farm corn harvest and tobacco harvest did not conflict. The corn was cut for fodder but if it had been cut for silage there might have been a conflict. The tobacco demanded 194.1 hours of man labor per acre and yielded a profit of $16.61 per acre or 9 cents per hour of man labor.

The problem of crop selection may be illustrated and further elaborated by the study of Figs. 14–19. It happens that the farmer for whom these records were tabulated produced barley, oats, spring

wheat, hay, corn, and tobacco. When the field labor on this farm is charted, it becomes obvious that during May, June, and a part of July, corn and tobacco are competitive. The labor is some days on the one crop, some days on the other, and knowing the character of the crop it is fair to assume that had he planted more corn and no tobacco, the time put on the tobacco during the period of planting and cultivation would have been put on the corn (Figs. 18 and 19).

When the three small grains are compared with corn and tobacco, it is clear that they are sowed before the time for planting corn or tobacco; also that they are harvested in the latter part of July, apparently after the tilled crops were laid by. This suggests that these small-grain crops are complementary to the tilled crops from the standpoint of demand for man and horse labor. It is known also that these groups of crops are complementary from the standpoint of the demands of a good system of crop rotation. The small grains may provide nurse crops for grasses and legumes. The tilled crops clean and give tilth to the land.

In studying the demands of the various crops upon the time of the farmer, operations should be divided into two classes: (1) those which must be done within very narrow limits of time, such as seeding and harvesting of small grain, the planting and cultivation of tobacco, and (2) those which can be done equally well at any time through a period of considerable length, such as plowing and thrashing. Labor of the former class should always take precedence over that of the latter class, but labor of the second class should not be put off until it must be done when labor of the first class is demanding attention. If plowing is left too long, it may delay the planting; if threshing is postponed too long, it may conflict with tobacco harvest or silage cutting.

Passing from these more general conditions shown by the chart to the further details of each of these groups, it is interesting to note the way in which this farmer employed his labor on the three spring-grain crops. The wheat and the oats were seeded and harvested so nearly at the same time that they appear to be strictly competitive. The barley, however, is sown later and harvested earlier. Barley has a shorter season. By a proper combination of barley with the other spring grains, both the seedtime and the harvest were spread over a longer period. This might have been accomplished by selecting two varieties of oats which vary in length of their period of growth.

While corn and tobacco appear to be competitive during the season when corn is cultivated, it appears that they are complementary in

their demands for labor in the later operations. The cutting of the tobacco preceded the cutting of the corn and the husking or shredding of the corn preceded the stripping of the tobacco. Had the corn been cut for silage, the harvesting of the corn and the tobacco might have demanded labor at the same time.

Hay harvest took the labor of the farm from the corn and tobacco fields for about a week at the end of June. Hay crops differ with respect to the time they must be harvested. The later in the season of corn cultivation the hay harvest comes the less serious is the conflict with the corn crop. The cultivation of corn when it is small is a slower process than when it has attained a height of a foot or more. The amount of corn one can cultivate when it is small sets a limit to the size of the corn crop. One can cultivate this amount at the later stages and have time left for making hay. Hence the hay harvest may come at a time when it can be counted complementary to corn. A study should be made of alfalfa, clover, and other hay crops with respect to the way in which they can be fitted into a system of complementary enterprises. If, for example, it should be shown that the first cutting of alfalfa must be harvested just at the time when corn demands its first cultivation, it would become obvious that to increase the alfalfa crop will necessitate a reduction of corn. The question then would be, "Which of these crops adds most to the profits of the farm?"

The next step in the study is to compare the relative profitableness of the competing crops. The accompanying table illustrates methods of comparing relative profitableness.

METHODS OF COMPARING PROFITS*

Crop	Profit per Acre	Profit per Hour of Labor
Barley	$12.75	$0.734
Oats	13.97	0.785
Wheat	19.72	0.969
Hay	14.16	1.868
Corn	6.82	0.371
Tobacco	18.59	0.093

* Based upon records secured in co-operation with the United States Department of Agriculture.

These figures are for the same farm for which the labor distribution is shown in Figs. 14–19. In calculating profits on the specific crops the general farm expenses were not considered. It is *relative* profitableness, not the absolute net profit, which is compared.

No generalization can be drawn from this table as to which crops will, as a rule, be most profitable to the farmer. It happened that the small-grain crops were good and the corn crop generally poor the year these records were kept. It happened also that half the corn and all the tobacco had to be planted a second time, which increased the labor cost of these crops. But this table is of significance in that it contains evidence that the farmer or the experiment station worker is in danger of going wrong if he applies generally the common method of comparing profits per acre. On the basis of profit per acre, the tobacco was almost three times as profitable as the corn, but on the basis of profit per hour, the corn was about four times as profitable as the tobacco. Where approximately the same labor is expended per acre the same result is reached, whether one uses the acre or the labor basis. As has already been suggested, profit per acre multiplied by the number of acres the farmer can handle of the two crops may be a means of combining the acre and the labor basis of calculating relative profits.

The relative merits of these methods will not be discussed here. All methods should be tested and a search made for the best possible plan for comparing the profitableness of crops.

Taking profits per unit of labor as a starting-point for further consideration, note some of the limitations and complexities involved in its use. Where two crops can be found which require the attention of the farmer at exactly the same time throughout all their operations and in forms of labor which require the same amount of managerial activity per unit of labor, the question of relative profitableness is easily worked out on the basis of profit per unit of labor, but where crops are competitive for a portion of the year and complementary for the remainder of the year, the solution of the problem of relative profitableness is not so simple.

Corn and tobacco give a good example. These crops are competitive at the states when it is vital that the work be done without delay. This means that the one crop cannot be increased without decreasing the other. Yet a very large proportion of the labor on these crops can be performed, as shown in Figs. 18 and 19, without any conflict of one with the other. Before any conclusion can be drawn as to which of these crops yields the larger return per unit of labor it is necessary to ascertain to what alternative use the labor could have been put and the rate of return the labor would have yielded during the time devoted to harvesting and stripping the tobacco and the time of harvesting and shredding the corn. Using this rate as the

"opportunity cost" of the labor at these periods and charging it against the crop using the labor at these times of non-competitive use, the remainder of the net return to labor can all be accredited to the labor during the period of competitive use. The crop which, by this method, shows in the long run the highest return to labor during the competitive period will prove the more profitable.

While the above illustrations relating to what to produce deal with crop selection, the problem of whether to sell or feed the feedable products of the farm, and the problem of the kind of live stock to keep, are equally important. The attention of a skilful accountant is required to plan a system of records which will give basis for passing judgment on these questions.

131. A SYSTEM OF FARM COST ACCOUNTING[1]

By C. E. LADD

The farmer wishes to know how much he is making or losing on his business each year, how much he is making or losing on each crop or class of animals, and how he can improve his business so as to make more money. Cost accounting for the farm is the same sort of work which the large meat-packing companies are doing to learn whether they make a profit on canned goods, smoked meats, etc. The farmer wishes to know whether his wheat pays and whether his cows or orchard pay. These are some of the things which a set of farm cost accounts will show.

Many farmers are desirous of keeping accounts of this sort, but do not know how to start. Undoubtedly many are deterred from starting because they believe that they do not know enough about bookkeeping and because they have in mind no definite method of procedure. To any such men who desire to keep accounts and who have not worked out a system for themselves, it is believed that the system outlined in this paper will be helpful.

Farm cost accounting, of necessity, involves many estimates, but there is no reason why one should lose faith or be discouraged because of them. If the worker has reasonably good judgment and is not prejudiced in favor of any crop or animal, he can obtain satisfactory results. The systems of cost accounting in use by the large packing companies and by large wholesale grocery houses involve as many estimates and do not give any more accurate results than do well-kept farmers' accounts.

[1] Adapted from *Farmers' Bulletin 572.*

Cost accounts cannot be absolutely exact. They contain many estimates. It is foolish to spend time with the refinements in methods of bookkeeping that are designed to check exact work to the last cent. In fact, attempts to find insignificant errors often disgust persons with the whole question of accounting.

In order to have a complete set of farm accounts three records are necessary: (1) an inventory at the beginning and at the end of the year; (2) an account of all money paid out or received; (3) a record of all work done by men and horses during the year.

The annual inventory shows the annual gain or loss on the farm business, but it does not show what crops or what animals have made a gain or loss. On nearly every farm where accounts have been kept the gain or loss for the year resulted from losses on several accounts and gains on several accounts. In every case the farmer was much surprised to see which accounts showed a gain and which a loss. Results like these can only be shown by a complete system of accounts.

A record of the receipts and expenditures on the farm is necessary for a complete set of accounts. For this purpose the page is ruled and items are entered as shown in the sample account with potatoes in Table II. The financial record book at the end of the year becomes the completed account book and will have a summary of labor entered in it from the work record as described later.

A separate account is kept with real estate, each crop grown, each class of animals, machinery, labor, interest, persons dealt with, bills payable and bills receivable, and with such other items as may be found necessary or convenient.

The items that make up bills payable and bills receivable should be listed in the inventory at the end of the year, as mentioned, either from memoranda or in any other way which may be found convenient. In closing out the inventory at the end of the year, the items for which money is due or owing should be charged or credited to their respective accounts. When these bills are settled, during the early part of the following year, the entries should be made under bills payable or bills receivable, as the case may be.

In this book two pages facing each other are taken for each account. The name of the account is written at the top of the page. The right-hand page is marked "Credits," and is used only to record credits to the account. The left-hand page is marked "Charges," and is used only for charges against the account. The pages then appear as shown in the sample account with a crop of potatoes (Table II).

TABLE II

A Sample Account with Potatoes in a 14-Acre Field*

Charges			Credits		
1913	Item	Amount	1913	Item	Amount
June 3	Seed, 160 bushels, at 45 cents	$ 72.00	Oct. 5	Sold, 226 bushels, at 60.18 cents	$136.00
4	Corrosive sublimate, 3 ounces	0.30	20	Sold, 510 bushels, at 62 cents	316.20
10	Seed, 43¾ bushels, at 55 cents	24.06	Nov. 1	Sold, 241 bushels, at $1.083	261.02
11	Corrosive sublimate, 6 ounces	0.60		Saved for seed, 135 bushels, at $1.00	135.00
July 12	Paris green, 6 pounds	1.32		Saved for home use, 16 bushels, at 60 cents	9.60
15	Lead arsenate, 160 pounds	14.40		Residual manure, 60 per cent of 1911	18.00
	Use of land, 5 per cent on $100 per acre	70.00		Residual manure, 30 per cent of 1910	6.00
	Man labor, 796 hours, at 19.02 cents	151.40			
	Horse labor, 839 hours, at 10.46 cents	87.76			
	Equipment labor, 839 hours, at 3.5 cents	29.36			
	Manure, 60 per cent of 1910 application	12.00			
	Manure, 100 per cent of 1911 application	30.00			
	Total charges	$493.20			
	Gain	388.62			
	Grand total	$881.82		Total credits	$881.82

* In the account book the items for "Charges" will occupy the entire left-hand page, and those for "Credits" the entire right-hand page.

Now, suppose that on a trip to town on June 1 one spends $1.40 for horseshoeing, $3 for fencing, $5 for cow feed, and receives a $65 check for 6,500 pounds of milk. The entries are made as follows: The account marked "Horses" is turned to and on the left-hand page is entered "June 1—Shoeing, $1.40." The "Real estate" account is turned to and on the left-hand page is entered, "June 1—Fencing bought, $3." The "Cows" account is turned to and on the left-hand page is entered, "June 1—Cow feed bought, $5." On the right-hand page, under this same account, is credited, "June 1—Milk, 6,500 pounds, $65."

These entries are now complete; they will never have to be posted or entered again in any way. It is often advisable to keep a memorandum book in the pocket in which to make notes when money is paid out in town, so that the items will not be forgotten before they can be entered in the account book.

Whenever money is paid out, the farmer turns to the account in the book to which this money should be charged and enters it on the left-hand page. Whenever money is received the amount is credited to the proper account by entering it on the right-hand page under that heading. These are the only entries made. The amounts are charged or credited directly to the accounts to which they belong.

Work record.—For the work record, a book ruled exactly like the financial record book, except that there should be two double columns at the right of the page, may be used. This should be indexed in the manner already described. In this book no separate pages are used for charges and credits and no entries are made in terms of dollars and cents. In the first double column at the right-hand side of the page are entered man hours and minutes, and in the second are written horse hours and minutes. These headings should be placed at the top of each column, so that the page appears as shown in Table III. This book contains simply a record of the work done on the farm during the year, classified according to the enterprise for which it was done, and it also gives the date and number of hours of each operation.

The sample record with wheat shown as Table III will serve to illustrate the way the items should appear in the work record.

Suppose that the date is May 1. The work done on this day aside from chores was drilling in oats 6 hours, with 2 horses; plowing for corn 8 hours, with 3 horses; repairing plow, 2 hours of man labor alone. The entries are made as follows: The "Oats" account is turned to, "May 1" written in the left-hand column, the single word

"Drilling" written in the broad space in the middle of the page, and the figure "6" entered under man hours. Since 2 horses were used for 6 hours, the figure "12" should be entered under horse hours. In the same way, on turning to the "Corn" account, "May 1—Plowing, 8 [under man hours], 24 [under horse hours]" is entered. Turning to

TABLE III

A Sample Work Record with Wheat

1912	Operation	Man		Horse*	
		Hours	Minutes	Hours	Minutes
Aug. 2....	Plowing oats stubble.....	8	30	17	
	Rolling.....	1	45	3	30

*Horse hours are expressed in terms of one horse for one hour. Hours of horse labor should not be charged against the horse account.

the "Machinery" account "May 1—Repairing plow, 2 [under man hours]" is entered. When this is done, the work entry for the day is complete; it will never have to be posted or written again. The original entry is the only entry made.

For chores a special page should be ruled for each month, as shown in Table IV.

TABLE IV

A Sample Heading for a Page of an Account Book Showing the Special Ruling Required for Entering Chores*

1913	Horses		Cows		Poultry		Hogs	
	Hours	Minutes	Hours	Minutes	Hours	Minutes	Hours	Minutes
May 1.....	2	20	4	15		30	1	10
2.....								
3.....								
4.....								
Etc....								

*If horses are used in the chore work, extra columns must be ruled under each heading to provide a place of entry of hours and minutes of horse labor.

It is more accurate to enter the chores every day; but, if chore time is fairly uniform each day, so that the chore work for the entire month can be based on fewer entries, an entry at the beginning, at the middle. and at the end of the month will ordinarily be sufficient.

Entries should be made at other times if the time spent on chores changes; for instance, when the cows are turned to pasture, when additional cows freshen, or when a change of feed is made which will require more time or less time for chore work.

Daily work necessary to keep a complete set of accounts.—The daily work of keeping a complete set of accounts ordinarily consists in entering receipts and expenses for that day and recording the hours of work done. On many days there are no cash receipts or expenses, as these are likely to be bunched on the days when trips are made to town. The entry of these items with the filling of the chore blanks for that day, if necessary, should not take more than five minutes. It is being done in less than an average of five minutes every day by 51 New York farmers, whose education varies from that acquired in a district school to that of the college graduate, all of whom are working every day in the field with their hired men.

Entries of the value of all home-grown feeds consumed must be made in the live-stock accounts. All the feed bought is charged in the financial record book directly against the animals for which it was bought. If the hog feed were to run out some day and a bag of cow feed were taken to the hogs, the entries should be made in the financial record book just as if the cows had sold this feed and the hogs had bought it.

At the time of thrashing or at the close of haying the total crop may be entered as a memorandum on the credit side of the proper crop account, but the figures are not yet to be carried to the money column. Estimates can be made with fair accuracy by measuring bins and haymows or by counting the loads drawn and estimating the average weight. The values will be entered when the product is sold or transferred to the animals. When these crops are fed out, an estimate must be made of the proportion fed to cows, horses, and other stock and these accounts charged with the values thereof, credit being given the crops. The quantity sold will be known from weighing bills or otherwise, and it should be credited as a cash receipt.

Whenever grain or hay is fed from the same bin or mow to two or more classes of animals, a day's ration for each class of animals may be weighed or measured once a month or oftener and the proper proportion of the total feed, based on these weighings and the number of days fed, charged to each class of stock.

Closing the accounts at the end of the year.—Considerable time is required to close the set of accounts. However, this figuring should

come in the winter at a time when other work is usually slack and when the weather is more favorable for working indoors than out. A definite order should be adhered to in closing the accounts. This order may be as follows:

1. The first step is to take a final inventory in the same manner as at the beginning of the year. This inventory should include all bills that other persons owe the farmer and all bills which the farmer owes to other persons.

2. The list of bills payable should be inspected and any items that have not yet been charged should be charged to the proper accounts. For instance, if $15 for labor is still due the hired man at the date of closing, this item should be entered as a charge against labor.

3. The list of bills receivable should be inspected, and any items that have not yet been credited should be credited to the proper accounts.

4. The record of all feed transferred to the live stock should be completed, charging the various animals and crediting the various crops. Produce raised and fed is charged against the animals at what it is worth on the farm.

5. The various classes of live stock should be credited with the portion of unused feeds which were charged to them at the time of purchase or harvest.

6. The use of pasture should be credited directly to the real estate or to a pasture account and charged against the animals using it.

7. The value of produce used in the house, if not noted before, should be entered. The proper crops or animals should be credited and charges made against the personal account.

8. The entry of value of board, produce, or other allowances furnished to the laborers should be completed. These charges should be made against labor and the proper accounts credited.

9. The value of unpaid labor, such as work by the farmer himself, by boys in the family to whom regular wages are not paid, and milking or other farm work by women of the family should be entered. Make these charges against labor and credit the personal account.

10. The animals should be credited with the value of the manure produced and this amount charged against the crops to which it was applied.

11. The proper amounts for the use of the buildings by crops, animals, the farmer, or laborers, should be entered. As a general rule, 8–10 per cent of the current value of the buildings may be charged as rent. The proportion of the whole sum which each class of animals or each crop should pay will have to be determined by the farmer in proportion to the amount and value of the space occupied by each.

12. Taxes and insurance paid on personal property should be distributed to the proper accounts.

13. All the hours and minutes of man labor on each enterprise, including the chores, should be added up, these totals being brought together and the sum of the man hours on all enterprises found.

14. The total cost of man labor for the year should be found.

15. The rate per hour should be found by dividing the total cost of man labor by the total hours of man labor.

16. The total number of hours found against each enterprise in the work record should be transferred to the same accounts in the financial record, multiplying each total by the rate to obtain the cost. These items should be credited to labor in the financial record book. When this is completed, the labor account should balance within a few dollars. This difference or error is not important enough to consider. It may be carried to the "Loss and gain" account, or it may be added to or subtracted from one of the larger items of labor.

17. All the hours and minutes of horse labor spent on each enterprise, including any horse labor on chores, should be added up, these totals being brought together and the sum of the horse hours on all enterprises found, just as was done for man labor.

18. To find the total cost of horse labor, first the horse inventories should be entered, the first inventory as a charge and the second as a credit to the horses. Then the horses should be charged with interest on the average of the two inventories at the current rate in the section and the interest account credited. The ordinary rate charged in most parts of the United States is 5 or 6 per cent on the investment.

19. The sum of each side of the horse account should be found. The sum of the credits should be subtracted from the sum of the charges and the difference will be the net cost of horse labor for the year. No charge is made against horses for the use of the harness and other horse equipment, all these costs being charged against the various enterprises in the machinery charge, as hereafter explained, on the basis of horse hours.

20. The rate per hour of horse labor should be found by dividing the total cost by the total hours. The figure thus obtained is the rate per hour.

21. The total number of horse hours found against each enterprise in the work record should be transferred to the same accounts in the financial record, multiplying each total by the rate to obtain the cost. These items should be credited to the horse account in the financial record book, and the account balanced as in paragraph 16.

22. To find the use cost of the machinery, the first machinery inventory should be entered as a charge and the second as a credit to the machinery account, then this account should be charged with interest on the average of the two inventories, as directed for the horse account. The interest account should be credited with the amount of this interest.

23. The sum of each side of the machinery account should be found and the credit total subtracted from the charge total, the same as for the

horse account. The difference is the total use cost of the machinery for the year.

24. In order to distribute this cost, it may be assumed that for every hour horses were worked machinery was also used. Then each account will have charged against it the same number of machinery hours as horse hours. To find the rate of cost per machinery hour, the horse hours already charged to machinery should be first subtracted from the total hours of horse labor and the total cost of machinery use divided by this difference. Now the use of machinery for the year should be charged in the same way that the use of horses was charged, except the charge against machinery. When this is complete, the machinery account should balance within a few dollars. The difference may be treated as explained in paragraph 16.

25. Any other accounts of convenience, such as those for fertilizer or manure, if kept, should be distributed.

26. All the remaining items should be entered in the inventories. The inventory values for the beginning of the year should be entered on the left-hand page of the separate accounts as a charge. The final inventory for the year is likewise distributed to the separate accounts, but the items are entered on their respective right-hand pages.

27. The interest, based on the average inventories against all accounts not already charged, should be charged and the interest account credited with the total, using the same rate as that used in charging interest against the horse and machinery accounts.

28. The proper charge for the use of the land should be entered. The rate should be high enough so that, with the use of buildings as charged in paragraph 11, it will cover interest on the investment in land and buildings, taxes on real estate, and repairs to buildings and fences, for these items were charged to the real estate account. Each crop should be charged for the land it occupied and the real estate account credited.

29. Both sides of the accounts not yet closed should be footed up. The lesser total should be subtracted from the greater in each account. If the charge side is greater the difference represents a loss, and if the credit side be greater, a gain. The sample potato account given in Table II (p. 407) will illustrate a completed crop account.

30. A list of the losses and gains should be made and the total of each found in order to show the net gain or loss on the whole business.

31. Each account and the business as a whole should be studied in order to learn how to improve it.

VIII

PRINCIPLES OF VALUE AND PRICE AS RELATED TO FARM PRODUCTS

Introduction

The ignorant farmer ascribes his own poor crops and his neighbor's larger yields to "luck," and thinks that mysterious and malevolent forces bring diseases upon his beasts and pests upon his growing plants. In these circumstances he is powerless, because he possesses no control over the powers that determine his harvest. The intelligent farmer, on the other hand, learns the life-cycle of the insect that destroys his crop, and strikes it in its susceptible stage. He learns the truth about hog cholera, and vaccinates his pigs and disinfects his premises. Knowledge gives him control of the elements of soil fertility.

The same change is coming about in connection with the subject of values and prices. Farmers are beginning to be convinced that there are certain great forces working in the market, and that economic principles are competent to explain the manner in which market prices are created. Instead of blaming the dealer or the consumer for low prices, and talking of "fair" and "just" values, we are coming to see that we must work out our own salvation, and that knowledge gives control of the economic forces of the market not less than of the biologic forces of the field.

The commercial farmer must face the problem of what he can sell, just as much as he must face the problem of what he can raise. If he aspires to make his sales profitable, he needs to study the extent and character of demand. Mr. Holmes has shown that the grower cannot raise what he himself likes and would desire to buy, for the consumer has other tastes and standards of judgment. Nor can he devote his attention to raising the things that grow best on his soil, regardless of whether they sell readily in his market. If, however, he can discover a reason why they *should* sell well, he has a good opportunity to create or stimulate a demand for the product which he could produce efficiently. (See selection 26.)

These conditions of demand being ascertained, and the possibilities of modifying it having been exhausted, the farmer must direct his efforts toward creating a supply situation which will meet the demand

of the market upon a level of profitableness to himself. If all farmers reduce their acreage of a given crop or if some of them go out of that line of production altogether, the supply is reduced, and this lessened amount equated against the higher-priced portion of the whole demand. Undoubtedly such rational control of market supply is hindered by the farmer's lack of accurate knowledge of his costs of production, by the vagaries of the weather, and by the lack of harmony of action among many individual producers. Undoubtedly, too, the first and last of these difficulties are being gradually removed. Also the work of the Office of Markets of the United States Department of Agriculture is doing much to give producers of many of the less staple commodities a much broader and more accurate view of the actual conditions of demand in all markets and the supply available in competitive producing sections. All these influences tend to increase the farmer's control over the forces under whose influence his prices are made.

It is evident, however, that the farmer does not deal directly with those who are the ultimate demanders of his goods. He comes into direct contact, instead, with the dealers, who are the deputies, more or less remotely removed from the actual consumer of the goods. And since the ultimate parties to the contract come together only through the mechanism of the market, it becomes a matter of much concern whether this market mechanism be well designed and working smoothly; whether, in a word, it performs its task efficiently. Section F calls attention to the part played by markets, and chap. ix takes up a discussion of some phases of their work.

A. Theoretical Foundations

132. OF VALUE AND PRICE[1]

By JOHN STUART MILL

The words "value" and "price" were used as synonymous by the early political economists. But the most accurate modern writers, to avoid the wasteful expenditure of two good scientific terms on a single idea, have employed "price" to express the value of a thing in relation to money; the quantity of money for which it will exchange. By the price of a thing, therefore, we shall henceforth understand its

[1] Adapted from *Principles of Political Economy*, Vol. I, Book III, chaps. i ii, iii, and vi.

value in money; by the value, or exchange value, of a thing, its general power of purchasing; the command which its possession gives over purchasable commodities in general.

Before commencing the inquiry into the laws of value and price, I must give warning, once for all, that the cases I contemplate are those in which values and prices are determined by competition alone. In so far only as they are thus determined can they be reduced to any assignable law. The buyers must be supposed as studious to buy cheap as the sellers to sell dear. The values and prices, therefore, to which our conclusions apply are mercantile values and prices; such as are quoted in prices-current; prices in the wholesale markets, in which buying as well as selling is a matter of business; in which the buyers take pains to know, and generally do know, the lowest price at which an article of a given quality can be obtained; and in which, therefore, the axiom is true, that there cannot be for the same article, of the same quality, two prices in the same market. Our propositions will be true in a much more qualified sense of retail prices; the prices paid in shops for articles of personal consumption. For such things there often are not merely two, but many prices, in different shops, or even in the same shop; habit and accident having as much to do in the matter as general causes. Purchases for private use, even by people in business, are not always made on business principles: the feelings which come into play in the operation of getting and in that of spending their income are often extremely different. Either from indolence, or carelessness, or because people think it fine to pay and ask no questions, three-fourths of those who can afford it give much higher prices than necessary for the things they consume; while the poor often do the same from ignorance and defect of judgment, want of time for searching and making inquiry, and not infrequently from coercion, open or disguised.

In all reasoning about prices, the proviso must be understood, "supposing all parties to take care of their own interest." Inattention to these distinctions has led to improper applications of the abstract principles of political economy, and still oftener to an undue discrediting of those principles, through their being compared with a different sort of facts from those which they contemplate, or which can fairly be expected to accord with them.

That a thing may have any value in exchange, two conditions are necessary. It must be of some use; that is, it must conduce to some purpose, satisfy some desire. No one will pay a price, or part

with anything which serves some of his purposes, to obtain a thing which serves none of them. But, secondly, the thing must not only have some utility, there must also be some difficulty in its attainment.

The utility of a thing in the estimation of the purchaser is the extreme limit of its exchange value: higher the value cannot ascend; peculiar circumstances are required to raise it so high. This topic is happily illustrated by Mr. De Quincey.

> Walk into almost any possible shop, buy the first article you see; what will determine its price? In the ninety-nine cases out of a hundred, simply the element *D*—difficulty of attainment. The element *U*, or intrinsic utility, will be perfectly inoperative. Let the thing (measured by its uses) be, for your purposes, worth ten guineas, so that you would rather give ten guineas than lose it; yet if the difficulty of producing it be only worth one guinea, one guinea is the price which it will bear. But still, not the less, though *U* is inoperative, can *U* be supposed absent? By no possibility; for, if it had been absent, assuredly you would not have bought the article even at the lowest price. *U* acts upon you, though it does not act upon the price.

The difficulty of attainment which determines value is not always the same kind of difficulty. It sometimes consists in an absolute limitation of the supply. There are things of which it is physically impossible to increase the quantity beyond certain narrow limits. Such are those wines which can be grown only in peculiar circumstances of soil, climate, and exposure. Such also are ancient sculptures; pictures by the old masters; rare books or coins, or other articles of antiquarian curiosity.

But there is another category (embracing the majority of all things that are bought and sold) in which the obstacle to attainment consists only in the labour and expense requisite to produce the commodity. Without a certain labour and expense it cannot be had: but when anyone is willing to incur these, there needs be no limit to the multiplication of the product. If there were labourers enough and machinery enough, cotton, woolens, or linens might be produced by thousands of yards for every single yard now manufactured.

There is a third case, intermediate between the two preceding, and rather more complex, which I shall at present merely indicate, but the importance of which in political economy is extremely great. There are commodities which can be multiplied to an indefinite extent by labour and expenditure, but not by a fixed amount of labour and expenditure. Only a limited quantity can be produced at a given

cost; if more is wanted, it must be produced at a greater cost. To this class, as has been often repeated, agricultural produce belongs, and generally all the rude produce of the earth; and this peculiarity is a source of very important consequences, one of which is the necessity of a limit to population, and another, the payment of rent.

First, of things absolutely limited in quantity, it is commonly said that their value depends upon their scarcity. Others say, with somewhat greater precision, that the value depends on the demand and the supply. But what is meant by demand? Not the mere desire for the commodity. A beggar may desire a diamond; but his desire, however great, will have no influence on the price. Writers have, therefore, distinguished the wish to possess, combined with the power of purchasing, and call it *effectual demand*. It is then said that the value depends upon the ratio between the effectual demand and the supply.

But again, the quantity demanded is not a fixed quantity, even at the same time and place—it varies according to the value; if the thing is cheap, there is usually a demand for more of it than when it is dear. The demand, therefore, partly depends on the value. But it was before laid down that the value depends on the demand. From this contradiction how shall we extricate ourselves? How solve the paradox of two things each depending upon the other?

Meaning, by the word "demand," the quantity demanded, and remembering that this is not a fixed quantity, but in general varies according to the value, let us suppose that the demand at some particular time exceeds the supply; that is, there are persons ready to buy, at the market value, a greater quantity than is offered for sale. Competition takes place on the side of the buyers, and the value rises: but how much? In the ratio (some may suppose) of the deficiency: if the demand exceeds the supply by one-third, the value rises one-third. By no means; for when the value has risen one-third, the demand may still exceed the supply; there may, even at that higher value, be a greater quantity wanted than is to be had; and the competition of buyers may still continue. If the article is a necessary of life, which, rather than resign, people are willing to pay for at any price, a deficiency of one-third may raise the price to double, triple, or quadruple. Or, on the contrary, the competition may cease before the value has risen in even the proportion of the deficiency. A rise, short of one-third, may place the article beyond the means or beyond the inclinations of purchasers to the full amount. At

what point, then, will the rise be arrested? At the point, whatever it be, which equalizes the demand and the supply: at the price which cuts off the extra third from the demand, or brings forward additional sellers sufficient to supply it. When, in either of these ways, or by a combination of both, the demand becomes equal and no more than equal to the supply, the rise of value will stop.

The converse case is equally simple. Instead of a demand beyond the supply, let us suppose a supply exceeding the demand. The competition will now be on the side of the sellers: the extra quantity can only find a market by calling forth an additional demand equal to itself. This is accomplished by means of cheapness; the value falls, and brings the article within the reach of more numerous customers, or induces those who were already consumers to make increased purchases. The fall of value required to re-establish equality is different in different cases. The kinds of things in which it is commonly greatest are at the two extremities of the scale—absolute necessaries, or those peculiar luxuries the taste for which is confined to a small class. In the case of food, as those who have already enough do not require more on account of its cheapness, but rather expend in other things what they save in food, the increased consumption occasioned by cheapness carries off, as experience shows, only a small part of the extra supply caused by an abundant harvest; and the fall is practically arrested only when the farmers withdraw their corn, and hold it back in hopes of a higher price; or by the operations of speculators who buy corn when it is cheap and store it up to be brought out when more urgently wanted. Whether the demand and supply are equalized by an increased demand, the result of cheapness, or by withdrawing a part of the supply, equalized they are in either case.

Thus we see that the idea of a *ratio*, as between demand and supply, is out of place, and has no concern in the matter: the proper mathematical analogy is that of an *equation*. Demand and supply, the quantity demanded and the quantity supplied, will be made equal. If unequal at any moment, competition equalizes them, and the manner in which this is done is by an adjustment of the value. If the demand increases, the value rises; if the demand diminishes, the value falls: again, if the supply falls off, the value rises; and falls, if the supply is increased. The rise or the fall continues until the demand and supply are again equal to one another: and the value which a commodity will bring, in any market, is no other than the

value which, in that market, gives a demand just sufficient to carry off the existing or expected supply.

Again, though there are few commodities which are at all times and forever unsusceptible of increase of supply, any commodity whatever may be temporarily so; and with some commodities this is habitually the case. Agricultural produce, for example, cannot be increased in quantity before the next harvest; the quantity of corn already existing in the world is all that can be had for sometimes a year to come. During that interval, corn is practically assimilated to things of which the quantity cannot be increased. In the case of most commodities it requires a certain time to increase their quantity; and if the demand increases, then, until a corresponding supply can be brought forward—that is, until the supply can accommodate itself to the demand—the value will so rise as to accommodate the demand to the supply.

When the production of a commodity is the effect of labour and expenditure, whether the commodity is susceptible of unlimited multiplication or not, there is a minimum value which is the essential condition of its being permanently produced. The value at any particular time is the result of supply and demand; and is always that which is necessary to create a market for the existing supply. But unless that value is sufficient to repay the cost of production, and to afford, besides, the ordinary expectation of profit, the commodity will not continue to be produced. The cost of production, together with the ordinary profit, may therefore be called the *necessary* price, or value, of all things made by labour and capital. Nobody willingly produces in the prospect of loss. Whoever does so, does it under a miscalculation, which he corrects as fast as he is able.

When a commodity is not only made by labour and capital, but can be made by them in indefinite quantity, this necessary value, the minimum with which the producers will be content, is also, if competition is free and active, the maximum which they can expect. If the value of a commodity is such that it repays the cost of production not only with the customary but with a higher rate of profit, capital rushes to share in this extra gain, and by increasing the supply of the article reduces its value. This is not a mere supposition or surmise, but a fact familiar to those conversant with commercial operations.

Adam Smith and Ricardo have called that value of a thing which is proportional to its cost of production its natural value (or its natural price). They meant by this the point about which the value oscil-

lates, and to which it always tends to return; the center value, toward which, as Adam Smith expresses it, the market value of a thing is constantly gravitating; and any deviation from which is but a temporary irregularity, which, the moment it exists, sets forces in motion tending to correct it. On an average of years sufficient to enable the oscillations on one side of the central line to be compensated by those on the other, the market value agrees with the natural value; but it very seldom coincides exactly with it at any particular time. The sea everywhere tends to a level, but it never is at an exact level; its surface is always ruffled by waves, and often agitated by storms. It is enough that no point, at least in the open sea, is permanently higher than another. Each place is alternately elevated and depressed; but the ocean preserves its level.

Every commodity of which the supply can be indefinitely increased by labour and capital, exchanges for other things proportionally to the cost necessary for producing and bringing to market the most costly portion of the supply required. The natural value is synonymous with the cost value, and the cost value of a thing means the cost value of the most costly portion of it.

133. UTILITY AND THE DEMAND SCHEDULE[1]

By ALFRED MARSHALL

"Utility" and "want" are taken as correlative terms. The utility of a thing to a person at a time is measured by the extent to which it satisfies his wants. Each several want is limited, and with every increase in the amount of a thing which a man has the eagerness of his desire to obtain more of it diminishes; until it yields place to the desire for some other thing, of which perhaps he hardly thought so long as his more urgent wants were still unsatisfied. There is an endless variety of wants, but there is a limit to each separate want. This familiar and fundamental tendency of human nature may be stated in the *law of satiable wants* or *of diminishing utility* thus:

The *total utility* of a thing to anyone (that is, the total pleasure or other benefit it yields him) increases with every increase in his stock of it, but not as fast as his stock increases. If his stock of it increases at a uniform rate the benefit derived from it increases at a diminishing rate. In other words, the additional benefit which a

[1] Adapted from *Principles of Economics*, I, 167–83. Copyright by Macmillan & Co., Ltd., London. Used by permission of the publishers.

person derives from a given increase of his stock of a thing diminishes with every increase in the stock that he already has.

That part of the thing which he is only just induced to purchase may be called his *marginal purchase*, because he is on the margin of doubt whether it is worth his while to incur the outlay required to obtain it. And the utility of his marginal purchase may be called the *marginal utility* of the thing to him. Or, if instead of buying it he makes the thing himself, then its marginal utility is the utility of that part which he thinks it only just worth his while to make. And thus the law just given may be worded:

The marginal utility of a thing to anyone diminishes with every increase in the amount of it he already has, supposing no time to be allowed for any alteration in the character or tastes of the man himself. It is therefore no exception to the law that the more good music a man hears, the stronger is his taste for it likely to become; that avarice and ambition are often insatiable; or that the virtue of cleanliness and the vice of drunkenness alike grow on what they feed upon. For in such cases our observations range over some period of time; and the man is not the same at the beginning as at the end of it. If we take a man as he is, without allowing time for any change in his character, the marginal utility of a thing to him diminishes steadily with every increase in his supply of it.

Now let us translate this law of diminishing utility into terms of price. Let us take an illustration from the case of a commodity, such as tea, which is in constant demand and which can be purchased in small quantities. Suppose, for instance, that tea of a certain quality is to be had at 2*s*. per pound. A person might be willing to give 10*s*. for a single pound once a year rather than go without it altogether; while if he could have any amount of it for nothing he would perhaps not care to use more than 30 pounds in the year. But as it is, he buys perhaps 10 pounds in the year; that is to say, the difference between the happiness which he gets from buying 9 pounds and 10 pounds is just enough for him to be willing to pay 2*s*. for it, while the fact that he does not buy an eleventh pound, shows that he does not think that it would be quite worth an extra 2*s*. to him. That is, 2*s*. a pound measures the utility to him of the tea which lies at the margin or terminus or end of his purchases; it measures the marginal utility to him. If the price which he is just willing to pay for any pound be called his *demand price*, then 2*s*. is his *marginal demand price*. And our law may be worded:

An increase in the amount of a thing that a person has will, other things being equal (i.e., the purchasing power of money, and the amount of money at his command being equal), diminish the price which he will pay for a little more of it; or in other words diminishes his marginal demand price for it.

His demand becomes *efficient*, only when the price which he is willing to offer reaches that at which others are willing to sell.

This last sentence reminds us that we have as yet taken no account of changes in the marginal utility of money, or general purchasing power. At one and the same time, a person's material resources being unchanged, the marginal utility of money to him is a fixed quantity, so that the prices he is just willing to pay for two commodities are to one another in the same ratio as the utility of those two commodities.

A greater utility will be required to induce him to buy a thing if he is poor than if he is rich. We have seen how the clerk with 100 pounds a year will walk to business in a heavier rain than the clerk with 300 pounds a year. But although the utility, or the benefit, that is measured in the poorer man's mind by sixpence is greater than that measured by it in the richer man's mind; yet if the richer man rides a hundred times in the year and the poorer man twenty times, then the utility of the hundredth ride which the richer man is only just induced to take is measured to him by sixpence. For each of them the marginal utility is measured by sixpence; but this marginal utility is greater in the case of the poorer man than in that of the richer.

In other words, the richer a man becomes the less is the marginal utility of money to him; every increase in his resources increases the price which he is willing to pay for any given benefit. And in the same way every diminution of his resources increases the marginal utility of money to him, and diminishes the price that he is willing to pay for any benefit.

When, then, we say that a person's demand for anything increases, we mean that he will buy more of it than he would before at the same price, and that he will buy as much of it as before at a higher price. To complete our knowledge of his demand for it, we should have to ascertain how much of it he would be willing to purchase at each of the prices at which it is likely to be offered; and the circumstance of his demand for, say, tea can be best expressed by a list of the prices which he is willing to pay; that is, by his several demand prices for different amounts of it. (This list may be called his *demand schedule*.)

Thus, for instance, we may find that he would buy

6	lbs.	at	50*d.*	per	lb.	10	lbs.	at	24*d.*	per	lb.
7	"	"	40	"	"	11	"	"	21	"	"
8	"	"	33	"	"	12	"	"	19	"	"
9	"	"	28	"	"	13	"	"	18	"	"

If corresponding prices were filled in for all intermediate amounts we should have an exact statement of his demand.

We cannot express a person's demand for a thing by the amount he is willing to buy, or by the "intensity of his eagerness to buy a certain amount," without reference to the prices at which he would buy that amount and other amounts. We can represent it exactly only by lists of the prices at which he is willing to buy different amounts.

So far we have looked at the demand of a single individual. And in the particular case of such a thing as tea the demand of a single person is fairly representative of the general demand of a whole market: for the demand for tea is a constant one; and, since it can be purchased in small quantities, every variation in its price is likely to affect the amount which he will buy. But even among those things which are in constant use there are many for which the demand on the part of any single individual cannot vary continuously with every small change in price, but can move only by great leaps. For instance, a small fall in the price of hats or watches will not affect the action of everyone; but it will induce a few persons, who were in doubt whether or not to get a new hat or a new watch, to decide in favor of doing so.

In their broad results the variety and the fickleness of individual action are merged in the comparatively regular aggregate of the action of many. In large markets, then—where rich and poor, old and young, men and women, persons of all varieties of tastes, temperaments, and occupations are mingled together—the peculiarities in the wants of individuals will compensate one another in a comparatively regular gradation of total demand.

There is then one general *law of demand*, viz., that the greater the amount to be sold, the smaller will be the price at which it will find purchasers; or, in other words, that the amount demanded increases with a fall in price, and diminishes with a rise in price. There will not be any exact relation between the fall in price and the increase of demand. A fall of one-tenth in the price may increase the sales by a twentieth or by a quarter, or it may double them. But as the numbers in the left-hand column of the demand schedule increase, those in the right-hand column will always diminish.

We have seen that the only universal law as to a person's desire for a commodity is that it diminishes, other things being equal, with every increase in his supply of that commodity. But this diminution may be slow or rapid. If it is slow, the price that he will give for the commodity will not fall much in consequence of a considerable increase in his supply of it; and a small fall in price will cause a comparatively large increase in his purchases. But if it is rapid, a small fall in price will cause only a very small increase in his purchases. In the former case his willingness to purchase the thing stretches itself out a great deal under the action of a small inducement: the elasticity of his wants, we may say, is great. In the latter case the extra inducement given by the fall in price causes hardly any extension of his desire to purchase: the elasticity of his demand is small.

And as with the demand of one person, so with that of a whole market. The *elasticity of demand* in a market is great or small according as the amount demanded increases much or little for a given fall in price and diminishes much or little for a given rise in price.

The case of necessaries is exceptional. When the price of wheat is very high, and again when it is very low, the demand has very little elasticity: at all events if we assume that wheat, even when scarce, is the cheapest food for man; and that, even when most plentiful, it is not consumed in any other way. We know that a fall in the price of the quartern loaf from 6*d.* to 4*d.* has scarcely any effect in increasing the consumption of bread. With regard to the other end of the scale it is more difficult to speak with certainty, because there has been no approach to a scarcity in England since the repeal of the corn laws. But, availing ourselves of the experience of a less happy time, we may suppose that deficits in the supply of 1, 2, 3, 4, or 5 tenths would cause a rise in price of 3, 8, 16, 28, or 45 tenths, respectively. Much greater variations in prices indeed than this have not been uncommon. Thus wheat sold in London for ten shillings a bushel in 1335, but in the following year it sold for ten pence.

There may be even more violent changes than this in the price of a thing which is not necessary, if it is perishable and the demand for it is inelastic: thus fish may be very dear one day, and sold for manure two or three days later.

Water is one of the few things the consumption of which we are able to observe at all prices, from the very highest down to nothing at all. At moderate prices the demand for it is very elastic. But the uses to which it can be put are capable of being completely filled,

and as its price sinks toward zero the demand for it loses its elasticity. Nearly the same may be said of salt. Its price in England is so low that the demand for it as an article of food is very inelastic; but in India the price is comparatively high and the demand is comparatively elastic.

The demand for things of a higher quality depends much on sensibility: some people care little for a refined flavour in their wine provided they can get plenty of it; others crave a high quality, but are easily satiated. In the ordinary working class districts the inferior and the better joints are sold at nearly the same price, but some well-paid artisans in the north of England have developed a liking for the best meat, and will pay for it nearly as high a price as can be got in the west end of London, where the price is kept artificially high by the necessity of sending the inferior joints away for sale elsewhere. Use also gives rise to acquired distastes as well as to acquired tastes. Illustrations which make a book attractive to many readers will repel those whose familiarity with better work has rendered them fastidious. A person of high musical sensibility in a large town will avoid bad concerts, though he might go to them gladly if he lived in a small town, where no good concerts are to be heard, because there are not enough persons willing to pay the high price required to cover their expenses. The effective demand for first-rate music is elastic only in large towns; for second-rate music it is elastic in both large and small towns.

Generally speaking, those things have the most elastic demand which are capable of being applied to many different uses. Water, for instance, is needed, first as food, then for cooking, then for washing of various kinds, and so on. When there is no special drought, but water is sold by the pailful, the price may be low enough to enable even the poorer classes to drink as much of it as they are inclined, while for cooking they sometimes use the same water twice over, and they apply it very scantily in washing. The middle classes will perhaps not use any of it twice for cooking; but they will make a pail of water go a good deal farther for washing purposes than if they had an unlimited supply at command. When water is supplied by pipes, and charged at a very low rate by meter, many people use as much of it even for washing as they feel at all inclined to do; and when the water is supplied not by meter but at a fixed annual charge, and is laid on in every place where it is wanted, the use of it for every purpose is carried to the full satiety limit.

134. CONDITIONS OF SUPPLY[1]

By F. W. TAUSSIG

In both of these statements of the principle of market value—the older one of an equation and the newer one of the marginal utility of supply—the underlying assumption is that a fixed quantity is put on the market. But is this assumption tenable? Does it conform to the usual state of facts? We have just said that demand, in the sense of quantity demanded, is not independent of price. Is not the same true of supply? In the ordinary case it is hardly accurate to say that the quantity offered in the market is fixed, and is independent of price. As price goes higher, more sellers will be tempted to offer their wares, and supply will become larger. As prices go lower, supply will become smaller. Must not the theory of market value be adjusted to variable supply as well as to variable demand?

It is true that in some instances the supposition of a fixed supply is clearly in accord with the facts. When a large crop of strawberries comes on the market it must be disposed of once for all. There is no keeping back any part of the supply of a perishable commodity. The total quantity on hand must be disposed of for what it will fetch—for the marginal price. Not very long ago the list of commodities of this kind was a large one; it included fresh fish, all vegetables and fruits, even meat. But modern improvements for the preservation of most such things, through cold storage and canning, has greatly shortened the list. Most commodities are not put on sale with headlong suddenness. They are offered in installments. They come into the market in a flow or stream, not as an abruptly offered stock. The rate at which they come in, and the amount which will be offered at any given time, depend on the price. A higher price quickens the flow and leads to larger supply; a lower price checks the flow.

It is not difficult to adjust the theory of market value to the case of variable supply. On Fig. 4, let SS' represent the conditions of a supply that varies with price, becoming greater as price rises and smaller as price falls. Here, as on the previous figures, quantities are measured horizontally along the axis OX or parallel to it, and prices perpendicularly along the axis OY or parallel to it. At the price SA, we may suppose the quantity OA to be forthcoming on the market. As the price rises, the quantity increases. At the price PP', the

[1] Adapted from *Principles of Economics*, I, 144–50, 170–71, 180–85, 189–91. (Copyright by the Macmillan Co.)

quantity offered is OP'; at the price $S'A'$, the quantity offered is OA'. Evidently the line SPS', which is the supply curve, has an upward inclination, the reverse of the inclination of the demand curve DD'. A rise in price, which causes the quantity demanded to become less, causes the quantity offered to become greater.

The supply and demand curves, moving in opposite directions, must meet; and in our figure they meet at P. The price PP' is the equilibrium price, the market price fixed by the play of varying supply and demand. At that point the quantity offered is equal to the quantity demanded: the equation is satisfied. If a higher price is asked, the quantity demanded will be less and the quantity offered will be greater. Sellers will put on the market more than buyers will take; price will fall; some sellers will then withdraw and some buyers will come in, until equilibrium is reached. And so in the reverse case: at any lower price, some sellers will withdraw, some buyers will be tempted in, and readjustment will again bring the price to the point of equilibrium, PP'.

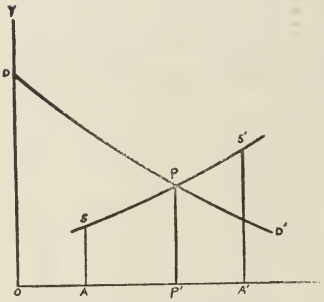


FIG. 4

It has just been said that of these two modes of statement—the one proceeding on the supposition of a fixed supply, the other on that of a variable supply—the second is more in accord with the facts. Yet the first also is so in accord. Both must be had in mind for an understanding of the course of prices in a market.

On any given day, in a well-organized market, the actual settlement of market price undoubtedly takes place through an adjustment of supply as well as through a response from demand. On the cotton exchange or the produce exchange, or in any place where brokers and dealers meet, a process of higgling and bargaining goes on. More or less of the article is offered and demanded, with fluctuations in prices which are usually within narrow limits on any one day and which result in an equilibrium price for that day. But this daily equilibrium price is itself affected by an underlying and more important equilibrium price. While the amount which is offered in the market from day to day—the supply—varies considerably, and varies in response to changes in price, the total amount which can be supplied over a

larger period usually is fixed. Take, as a typical case, the price of cotton, which fluctuates on the exchanges from day to day in response to the ever-changing play of offer and demand. The total amount of cotton available for the season is not a variable quantity. It is so much and no more, depending on the crop of that season. The price at which the whole will be disposed of depends on its marginal utility or on the equation of supply and demand (whichever mode of statement be preferred) and is the outcome of a total supply which is fixed. The fluctuations in price from day to day oscillate about this seasonal equilibrium price.

Still using the cotton market and cotton prices for examples, we may note that, while the supply for the season is fixed, no one knows in advance with certainty just how great that supply is; still less at what price the supply, even if accurately known, would be disposed of. Hence a period of uncertainty, of rumors and guesses, of selling and buying by brokers and dealers and manufacturers, by anyone who chooses to operate on the cotton market—in short, all the phenomena of speculation. Cotton in the United States (the crop in this country dominates the world-markets) is picked in the autumn and the amount harvested is known by December 1. But throughout the summer months there are reports of the condition of the growing plants, which foreshadow, though with uncertainty, the amount of the coming crop. During the picking season more and more certainty is reached. Finally, under modern methods of gathering such information, the amount comes to be accurately known. Then arises the question to what degree the price will be affected by the amount. It is certain that a small crop will command a higher price, a large crop a smaller price. But the conditions of demand or consumption are fluctuating from year to year, no less than the supply from the crops. Just what will be the seasonal equilibrium price for a crop of a given size no one can say in advance. It is reached by a succession of tentative market prices. From day to day, and from month to month, the market price is settled by the adjustment of variable amounts offered in the market by dealers. For the season, it is settled by the adjustment of a fixed supply to the marginal price at which the whole will be disposed of.

It is not to be supposed that even on a single day is there one price rigidly settled by the equilibrium of demand and supply. Even in the most highly organized markets there may be simultaneous sales at different prices; and, where there are newly discovered conditions

affecting the seasonal range, such as a crop report, there may be considerable fluctuations in the course of a day. These oscillations give the opportunity to the astute bargainer. Some buyers, not cool-headed enough to bide their time, will pay more than the equilibrium price. On the other hand, some sellers, unduly anxious lest their supplies be left on their hands, will sell at less. The shrewd and unexcitable person, carefully watching the course of dealings, may buy at one price from the overeager sellers and sell on the same day at a profit to overeager buyers.

What is true of cotton holds of other agricultural commodities, whose supply also is settled by the crops of each season: of wheat, corn, and other grains, of hay, flax and hemp, hops, sugar, tea, coffee. There is always a seasonal price, around which fluctuate the market prices for shorter periods. Virtually this holds of other commodities also. It is true that agricultural commodities show more unmistakably than most others the temporary fixation of supply. The supply of manufactured commodities changes more smoothly and continuously. The amounts offered in the market can often be increased and diminished without waiting for nature's processes of growth. But even here there are important limitations. For any given period of moderate length—a half-year or a year—there is something like a fixed supply.

VALUE AND COST OF PRODUCTION

I. In the preceding discussion of demand and supply and of market value, an absolutely fixed supply was assumed at the outset. Let now the other extreme be assumed, a supply absolutely flexible. Suppose a commodity produced, under the simplest conditions, by a large number of persons. Suppose that all these persons are competing with each other; that any one of them can easily engage in producing the commodity, and as easily withdraw from producing it. Suppose all to be carrying on operations under the same conditions, no one of them producing more cheaply than another. Such a commodity would be brought to market under conditions of constant cost, and would be sold at a price conforming to that cost. At any moment its value would indeed be determined directly by its quantity—that is, by marginal utility. But if its value, so determined, were greater than its cost, more persons would be led to engage in its production, supply would increase, and value would fall. If its value at any time were less than its cost, some persons would withdraw from its production, supply would decrease, and value would rise. The greater

the ease of entering on the industry and of withdrawing from it, the more rapid and certain would be the adjustment of supply to that amount which would just sell at cost price. If perfect flexibility in supply be assumed, the adjustment of value to cost would be perfect, and the article would always sell for just what it cost to produce it.

II. Let us suppose now that the several producers who compete with each other in putting a given article on the market have not the same facilities; that for some of them the expenses of production are greater than for others. We need not concern ourselves for the present with the question why there are such differences. Let us assume them to exist and consider what consequences follow.

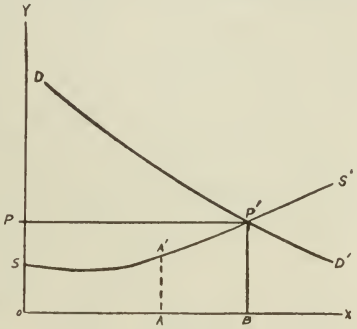


Fig. 6

The situation is illustrated by the diagram (Fig. 6). The conditions of demand are again indicated by the descending line DD'. The conditions of supply are indicated by the rising line SS'. The varying distance from the horizontal axis OX to the line SS' measures the varying cost of different installments of the supply. Some producers —those most favorably equipped—can put the commodity on the market at the comparatively low cost OS. Perhaps a certain moderate quantity can be so produced at constant cost. If the conditions of demand were such that only this moderate quantity were wanted at the constant cost price—if the demand curve were to intersect the supply curve somewhere near S—the normal price would be OS. So far the case would be identical with that studied in the preceding chapter. But now the conditions of demand, as indicated by the line DD', are such that a much greater quantity is wanted at the price OS than can be furnished at that price. The supply put on the market increases, but as it increases, additional installments can no longer be produced at the cost OS. With the quantity OA, for example, the cost of the last installment reaches AA'. As more is produced, cost still increases, indicated by the continuing ascent of the supply curve from A' to P'. At P' finally the demand curve is met. At the price BP' $(=OP)$ the quantity OB can be disposed of. Equilibrium is established; the quantity demanded equals the quantity supplied; and price settles at the amount BP'.

The whole supply will be sold at the price OP ($=BP'$); and the selling value of the whole, i.e., the quantity multiplied by the price, will be indicated by the rectangle $OPP'B$. It is true that the more fortunate producers could sell the commodity to advantage at a less price. At the price OS or AA' they would still find it worth while to bring it to market. But the total quantity which will meet the demand at an equilibrium price cannot be supplied unless producers less fortunate contribute their quota. These will not do so unless they get their higher cost price BP'. At that price the whole supply will be disposed of. The more favorably situated producers will get the price necessary to induce their rivals, who have poorer facilities, to contribute to the supply.

We may speak of the producers at B, whose cost of production is BP', as the marginal producers. Their cost price is also the measure of the marginal utility of the commodity. Marginal cost and marginal utility thus coincide; and when they coincide there is equilibrium. If the quantity supplied should increase beyond B, in the direction of Y, marginal utility would be less, and marginal cost would be greater. Supply could not long be maintained beyond the point B, for producers would then be receiving less than cost. So long as the conditions of demand and supply remained as indicated by the lines DD' or SS', price would settle at the amount BP'.

The relation of demand and supply to value is somewhat different here from what it was in the cases discussed above. Where the supply of a commodity is fixed, the value of it is settled by the conditions of demand; that is, by the marginal utility of that supply. Where, on the other hand, the cost of a freely produced commodity is fixed, the value of the commodity is settled by the conditions of supply; that is, by cost. Demand in this case determines, in the long run, only the quantity which shall be put on the market. But in the case now under consideration, the conditions of demand and of supply both have a permanent influence in settling price. As the quantity shifts, not only does marginal utility vary, but marginal cost. A lessening of demand would not only lessen the quantity put on the market, but would also lessen marginal cost. Conversely, an increase of demand would not only cause more to be put on the market, but would also raise normal price, since the additional quantity would be produced at greater cost. Hence demand and supply—marginal utility and cost—mutually determine normal price.

The economist who has best set forth the general theory of value, Professor Marshall, has ingeniously compared the influence of demand and supply to the working of a pair of scissors. If one blade of a pair of scissors is held still, and the other moves, we may say that the second does the cutting. Yet it could not cut unless the other blade were there. So when supply is fixed, we may say that demand settles value; yet it does so only because supply is there and does not move. When cost is constant, we may say that cost settles value. Yet it does so only because there is a demand for the commodity, and because supply readily adjusts itself to the amount which will be demanded at the cost price. If cost is variable in the manner discussed in the present chapter, both supply and demand—both cost and utility—exercise a mutual influence on normal price. Both blades of the scissors are in motion. All the various manifestations of value (under the conditions of an advanced division of labor and of exchange flowing from that division) can be analyzed as interactions of supply and demand. Neither can be said to settle value independently of the other.

The differences in advantage between producers may be due to permanent or to temporary causes. According as they are temporary or permanent, they are of very different significance for the theory of value and for the welfare of society.

Differences of a temporary sort are the most common. They are so common that they may be said in one sense to be universal. As indicated in the last chapter, it probably never happens in communities familiar to us that all those engaged in a given industry are carrying on their operations in the same way. Some have better plant, better organization, better location, than others; can bring their products to market at less expense; and, selling at the same price, can reap larger gains.

But these differences, if their causes are not permanent, tend constantly to disappear. If one man has better plant or machinery than another, and if there be no permanent reason why the second should not also set up the better outfit, he is likely sooner or later to do so. If he does not do so, he is likely to be driven out of the market. Others will adopt the more effective method of production, will increase the quantity they put on the market, and will be able to undersell him without foregoing a profit. Where the methods of cheapened production are open to all, they are sure sooner or later to be adopted by all.

The situation is otherwise where there are permanent causes of difference between producers. Then cost at the hands of the marginal producer does settle the long-run price. The point about which oscillations range, and to which price tends to conform, is cost for the least advantageous producer. Without him, the total supply cannot be enlarged to the point at which there is an equilibrium of normal supply and demand. If there were no limit to the amount which the more advantageous producers could bring to market—if this fortunate set of producers could increase the output indefinitely at constant cost—the marginal producer would be driven out and the conditions would be those of constant cost. There being such a limit, he must be called on for the maintenance of supply, and there must be in the long run a price which will make it worth his while to contribute. Value is then determined in the long run by cost to the marginal producer; but at what point in the varying scale of costs that producer will be, depends on the conditions of demand.

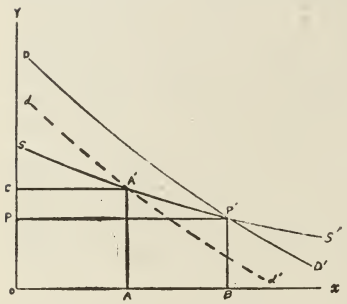


FIG. 7

III. We turn now to the reverse conditions, those of diminishing cost or increasing returns. Suppose that, as additional supplies of a commodity are produced, the cost of each unit becomes, not greater, but less. Such a tendency is represented in Fig. 7, where the line SS', indicating the conditions of supply, has a downward slope. The line DD', representing the conditions of demand, necessarily has a downward slope, indicating the diminishing utility of successive increments. Equilibrium will be reached at the point where the two curves meet, at P'. At that point the quantity brought to market sells at the price BP', which equals its cost of production. The total quantity put on the market will normally be OB, and its total selling price will be $OPP'B$.

It is to be observed that this figure represents a situation different in essential respects from that represented in Fig. 6 in the preceding discussion. In that case some among the competing producers were supposed to contribute to the supply at less cost than others. They reaped a producer's surplus. In the present case, however, all producers are on the same plane; all have the advantage of lessening cost

and increasing returns. No portion of the supply continues to be produced at a cost different from the marginal cost. With the supply *OB*, for example, the cost per unit of the commodity is *BP'* for each and every producer. If for any reason the supply should be reduced, cost for each unit would be greater. Suppose, for example, that demand should decline, the demand curve shifting to the left, to *dd'*, so as to intersect the supply curve at *A'*. The quantity normally supplied would then be *OA*, selling at the price *AA'*. All producers would find their cost per unit higher than when the quantity supplied was *OB;* for *AA'* is greater than *BP'*. But at neither price would there be differences between producers. Total cost and total selling value in either case would be represented by parallelograms; at the price *AA'* by the area *OAA'C*, and at the price *BP'* by the area *OPP'B*. There is no such phenomenon as surplus gain to any producer.

This case differs, again, from that considered previously. There the effect of a general lowering of the supply schedule was considered, on the supposition that the reduction was due to some extraneous cause not directly connected with increase in supply. Here the reduction is supposed to be chiefly due to such an increase: the mere fact of greater supply brings a decline in cost per unit of supply. Cost, uniform for all producers, becomes less for each as more is produced.

All these three cases, on the other hand, are alike, in that long-run results are considered. Uniformity of costs, and the automatic decline in cost for all producers, with increasing supply, never are found in industry. Where the conditions are favorable for a general decline in cost, some producers, as we have seen, take advantage of them more promptly than others; and so long as this "dynamic" situation continues we have a lowering of cost for some producers, but not for all. This situation, however, will not endure; those who do not avail themselves of the improvements are underbid and driven from the market, and the "static" state of uniform cost is approached. The case would be different if those who had the better facilities were not subject to competition from others on even terms, and could not themselves increase their output indefinitely at lower cost. With such a limitation to their advantages, we should have precisely the case of varying costs, as previously discussed. Here cost is supposed to be uniform, but not constant—it becomes less per unit as the number of units increases. The long-run result is an interaction of demand and supply; both blades of the scissors are cutting.

135. MONOPOLY PRICE[1]

By HENRY ROGERS SEAGER

Monopoly means usually in economics such control over the supply of an economic good as enables the monopolist to regulate its price. Monopolists, so far as they are free to obey the dictates of self-interests, tend to fix those prices for their products which will yield the largest monopoly profits. Just what this means may be made to appear from a simple illustration.

Consider the case of a patented article in genereal use, like a special brand of soap. As a rule, the expense of producing such an article diminishes as the number of units produced increases. On the other hand, in accordance with the familiar law of demand, as the number of units offered for sale is increased the price that can be secured for each unit decreases. Suppose that the volume of sales at different prices, the expense of production per unit for these different quantities sold, and the monopoly profits received are as represented in the accompanying table. It is clear from the study of this table that, on the conditions assumed, the price that affords the maximum

Price (Cents)	No. of Cakes Sold	Gross Receipts	Expense per Cake (Cents)	Gross Expenses	Profits
50.....	100,000	$ 50,000	12	$ 12,000	$ 38,000
40.....	130,000	52,000	11	14,300	37,700
30.....	200,000	60,000	10	20,000	40,000
25.....	400,000	100,000	8	32,000	68,000
20.....	600,000	120,000	7	42,000	78,000
15.....	1,000,000	150,000	6	60,000	90,000
10.....	2,500,000	250,000	5	125,000	125,000
9.....	3,000,000	270,000	$4\frac{6}{9}$	145,000	125,000
8.....	3,500,000	280,000	$4\frac{2}{7}$	165,000	115,000
7.....	4,000,000	280,000	$4\frac{6}{8}$	185,000	95,000
6.....	6,000,000	360,000	$4\frac{1}{2}$	270,000	90,000
5.....	10,000,000	500,000	$4\frac{3}{8}$	437,500	62,500
$4\frac{1}{4}$.....	14,000,000	595,000	$4\frac{1}{4}$	595,000	

monopoly profit will be somewhere between nine and ten cents. Until the price, ten cents, is reached, the larger volume of sales and diminishing expense per unit more than counterbalance the loss due to lowering the price. Below nine cents the loss in price is no longer offset by these other factors, although they continue to operate, and consequently profits decline. As this table indicates, monopoly price

[1] Adapted from *Principles of Economics*, pp. 213, 219–20. (Copyright by Henry Holt & Co.)

does not necessarily mean extravagantly high price. In this example the price most advantageous to the monopolist is about double the expense of production. In actual practice the margin of monopoly profit is apt to be even smaller than this except for goods the demand for which is quite inelastic.

When a monopolist enjoys exclusive control of the monopolized good, he may fix the price at the point affording the maximum profit without fear of exciting competition. But few monopolists are so fortunately situated as this implies. Competition, even though not in active operation, is an ever-present possibility with which most monopolists must reckon. Prudence, therefore, usually dictates a more conservative policy in reference to prices in order to protect the monopoly from future competition or from possible regulation by the government.

B. The Supply Side of Agricultural Prices

136. THE EFFECT OF OVERSUPPLY ON PRICE[1]

By C. WOOD DAVIS

From the close of the Civil War until near the middle of the ninth decade, the farmer shared in the nation's prosperity. In more recent years, however, this state of thrift has been succeeded by one of unremunerative toil, accompanied by much privation. When, as is now the case over vast areas, wheat sells at from 40 to 50 cents, oats at from 9 to 12 cents, and corn from 10 to 13 cents a bushel, and fat cattle from $1\frac{1}{2}$ to 3 cents a pound, the farmer can indulge in but few luxuries.

During a period of 39 years, ending in 1889, population, farms, and the production of the more important staples increased as follows:

Population	175 per cent
Number of farms	260
Cattle	185
Swine	66
Bales of cotton	201
Bushels of corn	257
Bushels of wheat	389
Bushels of oats	411

[1] Adapted from "Why the Farmer Is Not Prosperous," *Forum*, IX (March, 1890), 233–41.

As the result of an increase of farms and farm products so outstripping the increase in population, the only staples the growing of which is even fairly remunerative are pork and cotton. This is accounted for by our monopoly of the world's supply of cotton, and by the fact that the number of swine has not kept pace with the increase in population; but it does not follow that there is a deficient supply of swine, for the number of both swine and cattle was greatly in excess of requirements prior to the Civil War.

Except for brief periods, the prices of cattle continued remunerative up to the middle of the ninth decade, when the new farms of the West, the open range regions of Texas, the plains, and the mountain areas furnished a supply far in excess of demands, swamping the markets and reducing prices to a level precluding all profit. During twenty years the exportation of corn has averaged less than 5 per cent of the product, and of oats less than 1 per cent, and the price of these grains depends almost wholly upon the home requirements and the extent of the supply. That lower prices follow enlarged supply is evident; and a medium, or even a short, crop brings the farmer more profit, and often more money in gross, than does a full or large one, as is clearly shown in Table I, which goes far toward explaining why the farmer is not prosperous. To illustrate: the corn crop of 1889 exceeded that of 1887 by more than 656,000,000 bushels, yet, counting the cost of the extra amount handled, it will bring the growers $100,000,000 less. Again, the crop of 1878 was 64 per cent greater than that of 1874, and, allowance made for cost of handling, brought the farmer $149,000,000 less. The five crops of corn grown in the second half-decade tabulated exceeded the five crops of the preceding period by 2,128,000,000 bushels, yet the farmers netted $71,000,000 less therefrom. Doubtless a better result would have accrued had these 2,128,000,000 bushels been converted into fuel on the farms, as is being done with part of the surplus of 1889.

Covering twenty years of corn-production, Table I shows that in the first half-decade somewhat less than one acre of corn, or 24.4 bushels, per capita, was sufficient to meet all demands. In the second half-decade the corn area was increased to 1.1 acres per capita, the diminishing price indicating that 30.4 bushels for each person was more than was needed. This addition to the supply reduced the average returns from $13.32 to $10.10 per acre. During the third period the area increased to 1.25 acres per capita, the short crop of 1881 diminishing the per capita supply six-tenths of a bushel. The

TABLE I

Acreage, Product, Average Price, and Value of Twenty Corn Crops

Year	Population	Product in Bushels	Value of Each Crop and of Five Crops	Average Price in Local Markets	Average Value of Product per Acre	Average Yield in Bushels per Acre	Annual Product Per Capita; Average for Each Five Years
1870.....	38,558,371	1,094,255,000	$ 600,745,995	54.9c.	$15.54	28.3	
1871.....	39,555,000	991,898,000	478,275,900	48.2	14.02	29.1	
1872.....	40,596,000	1,092,719,000	435,149,290	39.8	12.24	30.7	
1873.....	41,677,000	932,274,000	447,183,020	48.0	11.41	23.8	
1874.....	42,796,000	850,148,500	550,043,080	64.7	13.40	20.7	
5 years.....	203,182,371	4,961,294,500	$2,511,397,285	50.6c.	$13.32	26.03	24.4
1875.....	43,951,000	1,320,069,000	$ 555,445,930	42.0c.	$12.38	29.4	
1876.....	45,137,000	1,283,827,500	475,491,210	37.0	9.69	26.1	
1877.....	46,353,000	1,342,558,000	480,643,400	35.8	9.54	26.6	
1878.....	47,958,000	1,388,218,750	441,153,405	31.8	8.55	26.9	
1879.....	48,886,000	1,754,591,676	657,971,879	37.5	10.55	28.1	
5 years.....	232,285,000	7,089,264,926	$2,610,705,824	36.8c.	$10.10	27.4	30 4
1880.....	50,155,783	1,717,434,543	$ 679,714,499	39.6c.	$10.91	27.6	
1881.....	51,495,000	1,194,916,000	759,482,179	63.6	11.82	18.6	
1882.....	52,802,000	1,617,025,100	783,867,175	48.4	11.94	24.6	
1883.....	54,165,000	1,551,066,895	658,051,485	42.4	9.63	22.7	
1884.....	55,550,000	1,795,528,000	640,735,560	35.7	9.19	25.8	
5 years.....	264,173,783	7,875,970,538	$3,521,850,889	44.7c.	$10.67	23.9	29.8
1885.....	56,975,000	1,936,176,000	$ 635,674,630	32.8c.	$ 8.69	26.5	
1886.....	58,420,000	1,665,441,000	610,311,000	36.6	8.06	22.0	
1887.....	59,893,000	1,456,106,770	646,106,770	44.4	8.93	20.1	
1888.....	61,690,000	1,987,790,000	677,561,580	34.1	8.95	26.3	
1889.....	63,540,000	2,112,892,000	597,918,829	28.3	7.63	27.0	
5 years.....	300,518,000	9,158,460,000	$3,167,572,609	34.6c.	$ 8.44	24.4	30.5

effect of this one short crop was to advance the average price for the five years 21 per cent. In the fourth half-decade there was no change in the area per capita, but an addition of seven-tenths of a bushel to the per capita supply, and an accumulating surplus of such dimensions as to force prices to the lowest point known. The price of corn in the home markets, December, 1889, was 11 per cent lower than ever before reported. Such has been the effect of the great crop of 1889, following one of nearly equal magnitude in 1888.

The history of American farming for twenty years is, in brief, that as the area in cultivation has increased, so has the product per capita, to be followed by ever-declining prices and diminishing returns per acre.

If, in the period ending in 1874, with a cattle supply of 62 to 100 people, the supply of corn less than 25 bushels per capita, that of wheat and oats less than 6.5 bushels, and the domestic consumption of pork 75 pounds for each inhabitant, all the requirements of the people for bread, meat, spirits, and provender were fully and promptly met, it is quite apparent that, estimating consumption per capita as 15 per cent greater than then, the present supply of beef is sufficient for 71,000,000 people, of swine for 76,000,000, of wheat for 79,000,000, of corn for 70,500,000, and of oats for more than100,000,000.

The logical conclusion from the evidence offered is that the troubles of the farmer are due to the fact that there are altogether too many farms, too many cattle and swine, too many bushels of corn, wheat, rye, oats, barley, buckwheat, and potatoes, too many tons of hay, and too great a production of nearly all other farm products for the number of consumers.

137. LIMITED SUPPLY AND HIGH PRICES[1]

One of the outstanding facts of the social history of the last half-century is the rapid growth of large cities. The proportion of the total population of the United States living in cities of 8,000 inhabitants and over increased from 12.5 in 1850 to 33.1 in 1900. In Massachusetts only about one-third of the population was living in cities in 1850, while more than three-fourths of the population is found in such cities at the present time.

In general, there has taken place a great decline in the number of persons engaged in agricultural pursuits, and a corresponding increase in the number of those employed in urban occupations: (1) a marked

[1] Adapted from the *Report of the Massachusetts Commission on the Cost of Living*, May, 1910.

relative decrease of food producers; (2) a relative increase of persons engaged in manufacturing industries up to 1890, and particularly in the decade 1880–90; (3) a slight decrease in the latter class since 1890; (4) a relative increase of consumers during the entire period, as represented by other occupation classes, especially professional service and trade and transportation.

Under the well-known law of diminishing returns, a commonplace of economic science, as population grows, recourse must be had to poorer soils or those less favorably situated. This may be delayed by agricultural invention or development, such as the devising of better implements or the learning of better methods of husbandry. But unless these obstacles intervene, the law is sure to work.

This is what has happened in America. From the earliest settlements on the Atlantic Coast until within the last few years there were at all times great areas of unoccupied lands open to the settler without price, or at the nominal prices offered by railroads as they were extended over the prairies. Thousands upon thousands of immigrants from the eastern states and from Europe spread over the land, in such numbers that production outran demand, until corn sold at 10 or 12 cents a bushel in the western central states, and at times was burned for fuel, because it was cheaper than coal or wood.

All this has changed. The pioneer has reached the last frontier. The overflow of population from countries where land is scarce has at last filled our vast areas, and now in turn is sweeping over the boundary into the plains of the Canadian Northwest. Yet the influx from the older countries continues. The hamlets of the West have become towns; the towns have become cities. The West has now an urban population of its own to feed, besides filling the mouths of millions in the cities of the seaboard.

We have come at last to the time when even a bumper crop, as the phrase goes, is little more than the supply for a year. A shortage makes trouble. Even slight diminutions are felt more keenly than actual crop failures of but a few years ago. We are facing the virtual disappearance of desirable free land, the breaking up of the cattle ranges into farms, the impoverishment of the soil in the Mississippi Valley, the mowing of the forests of Maine, Michigan, Oregon, and Washington. The new development of dry farming and the irrigation projects of the far West will perhaps for a time match the march of population, but in the end the birth-rate will control. It is said that the area of all the arid lands that can be made available by

irrigation will not exceed that of Illinois. The staple grains and food animals will always be raised on lands for the most part already occupied.

Proof that the home demand for the products of the soil is outstripping the home supply is to be found in the figures of imports. Note these comparisons:

Imports for Consumption	1899	1909
Breadstuffs	$ 940,364	$ 5,190,354
Meat and dairy products	1,950,835	6,503,773
Vegetables	2,170,959	8,029,748
Wood, and manufactures of wood	8,241,250	30,642,780

The value of the agricultural exports of domestic products for the year ending June 30, 1909, was $903,000,000, or $151,000,000 below the highest record of 1907, and $114,000,000 below the next highest, in 1908. The imports of agricultural products were never so high in value as they were in 1909, the amount being $637,000,000.

In 1899 the United States planted about 157,600,000 acres of corn, wheat, oats, barley, and rye. The yield averaged $22\frac{1}{3}$ bushels to the acre, aggregating 3,519,000,000 bushels, of which we exported about 356,240,000 bushels. In 1909 the acreage of these cereals had increased to more than 197,000,000 acres. The yield to the acre was slightly larger than in 1899; the aggregate production, 4,719,000,000 bushels; but our exports were only 112,140,000 bushels—a decrease of $68\frac{1}{2}$ per cent. Although the yield of the cereals to the acre as yet shows no widespread lessening, it is certain that we have passed the point of unaided fertility in the case of much the greater part of our soil. In New England we passed it years ago. The proof is to be found in the abandonment of farms and the reduction in the amount of improved acreage. The reduction in this acreage in New England from 1880 to 1900 was:

States	1880	1890	1900
Maine	3,484,908	3,044,666	2,386,889
New Hampshire	2,308,112	1,727,387	1,076,879
Vermont	3,286,461	2,655,943	2,126,624
Massachusetts	2,128,311	1,657,024	1,292,132
Rhode Island	298,486	274,491	187,354
Connecticut	1,642,188	1,379,419	1,064,525
Totals	13,148,466	10,738,930	8,134,403

138. PRODUCTION AND POPULATION[1]

By VICTOR H. OLMSTED

Frequent assertions that the fertility of the soils is washing into the streams and that the productivity of cultivated land is diminishing are misleading the public into the belief that the agriculture of this country is decadent. The real situation cannot be understood until it is examined historically.

From the ten-year period from 1866–1875 to that of 1876–1885 the production of corn per acre in the United States declined 2.3 per cent, and the only states in which there was a gain were Maine, Rhode Island, Delaware, Maryland, Nebraska, and California. From 1876–1885 to 1886–1895 the list of gaining states was increased by Vermont, Massachusetts, Connecticut, New York, South Carolina, Georgia, Florida, Illinois, Tennessee, Alabama, Mississippi, New Mexico, and Idaho, while Delaware, Maryland, and Nebraska were transferred from a gaining to a losing production. The decline of production per acre for the United States was 8.2 per cent. Advancing another decade to 1896–1905, corn production per acre gained in 30 of the 46 states and territories, and the United States average increased 7.7 per cent, in spite of the disastrous season of 1901. The mean production per acre during the four years 1906–1909 increased 7.1 per cent over the mean of the preceding ten years.

Wheat has been disposed to increase in production more generally than corn. From 1866–1875 to 1876–1885 the mean per acre increased in 12 states, and the increase for the United States was 3.4 per cent. In the next decade the mean production per acre increased in 24 out of 41 states and territories, and the gain for the United States was 3.3 per cent. In the decade 1896–1905, 35 out of 44 states and territories showed a gain, while the increase for the whole United States was 6.3 per cent over that of the previous ten years. The mean of the four years 1906–1909 shows a gain of 9.6 per cent over that of the decade preceding.

Tobacco production increased 3.4 per cent in the first decade, followed by a decline of 2 per cent, an increase of 5.2 per cent, and (for the final four-year period) of 9.7 per cent.

During two of the four years 1906–1909, the cotton production per acre was light because of adverse conditions and the boll weevil,

[1] Adapted from *Report of the Chief of the Bureau of Statistics, United States Department of Agriculture*, 1910, pp. 18–26.

but in spite of that the mean of these four years is 0.3 per cent above that of the ten years 1896–1905, which decade exceeded each of the three preceding decades in production per acre. For the United States the gain was 3.8 per cent over the mean of 1886–1895.

Potato production per acre in the United States declined sharply from 1866–1875 to 1886–1895, after which there was a marked increase in both the periods following. The gain for the United States was 15.3 per cent and the mean of the final four-year period is 15.5 per cent higher than that of the preceding ten years.

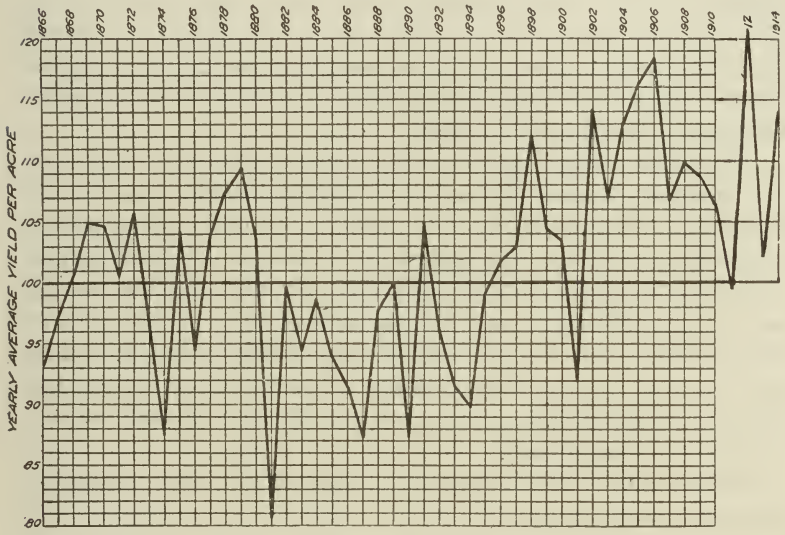
Hay stood higher in mean production per acre in 1896–1905 than in any of the preceding three decades, gaining 22 per cent over the period 1886–1895. A similar sort of statement applies to oats, the gain being 15.6 per cent in the decade 1896–1905. Again, for barley and rye a similar history appears. The former showed 11.1 per cent and the latter 21.3 per cent increase in the third ten-year period. After thirty years of decadence, buckwheat reached the highest production per acre in the records of this Bureau.

The chart on p. 445 shows the fluctuations in yield from year to year and the trend of production of our ten leading crops.

The statistical test that the farmers of this country have met in the foregoing examination of production per acre is not as severe as the one which in varying degrees and in varying numbers of states they are prepared to meet in a comparison of production per acre with population. There is a prevalent misunderstanding with regard to the nature of the increase of population in this country. It seems to be assumed that the net immigration is to continue for a century and over at the rate of one-half to three-fourths of a million people annually. How quickly immigration can be reduced to zero was shown by the industrial depression of 1908. No one who would take a far sight into the future would reckon upon an indefinite continuance of a considerable immigration. Likewise, the birth-rate of this country, as of all the countries of Western and Central Europe, is a diminishing one; so that while the increase of population must be admitted to the reckoning, a diminishing rate of increase must be recognized. The conclusion of a recent investigator of this problem was that the increase of population in this country, after eliminating the influence of the foreign-born upon the conglomerate national birth-rate, was about $1\frac{1}{2}$ per cent for the census year, or about $12\frac{1}{2}$ per cent for a decade.

The way is now prepared for a comparison of production per acre in recent years with the normal increase of population; that is to say, with the increase unaffected by immigration and the high birth-rate of the immigrants. This is the form of the problem as it will present itself more and more closely as the years elapse.

From 1886–1895 to 1896–1905 the mean production per acre of wheat increased in a greater degree than the normal increase of population in four New England states, New York, New Jersey, and



Yearly average yield per acre of 10 leading crops combined (representing in area nearly 95 per cent of all cultivated crops), 100 representing the average for the forty-three years, 1866–1908. (Figures for the last five years supplied by the editor.)

Pennsylvania, eleven southern states, Wisconsin, Nebraska, seven mountain states and territories, and Washington. Two states are very near inclusion in this list—Wyoming and Oregon. In the case of corn, increased production per acre has exceeded the normal increase of population in Pennsylvania, Delaware, Maryland, Virginia, West Virginia, Ohio, Indiana, Illinois, Michigan, Wisconsin, South Dakota, and three mountain states, and very nearly the required increased production was made by New Jersey, North Dakota, Nebraska, New Mexico, and Arizona.

A long list of states gained in production of oats per acre in a greater degree than the normal increase in population. With regard to barley twenty-one states and territories are found in the similar list; for rye the list of states numbers 30, for buckwheat 19, and Vermont, New York, and Delaware are near the requirement for admission to the list. Wisconsin is the only state that has produced tobacco with an increase during the time under consideration which is larger than the normal increase of population, but the increase is very nearly equal to this population increase in the case of Maryland, Virginia, North Carolina, Indiana, and Illinois. Increase of cotton production per acre above the normal increase of population is found in North Carolina, South Carolina, and Oklahoma, with a supplementary list of four states almost able to enter the list—Virginia, Tennessee, Georgia, and Louisiana.

The list of states that produced potatoes with an increase per acre above the normal increase of population contains many of the states in the potato belt, and the number is 24, with 4 states almost eligible for admission. The largest list of states in the consideration of the various crops in which production per acre exceeded normal increase of population is found in the case of hay; 35 states are in this list with 5 more states having increases nearly sufficient for their entry, so that the hay crop of nearly the entire United States has increased in production per acre faster than the normal rate of increase of the population.

A still more severe test than the foregoing may be placed upon the increased production per acre of the crops under consideration, and in this test the increase may be compared with the actual increase of population which, as before explained, is greater than the normal increase. Corn production per acre increased from 1886–1895 to 1896–1905 at a rate which quite or very nearly equaled the actual increase of population in Delaware, Maryland, Virginia, West Virginia, Ohio, Illinois, Wisconsin, Michigan, South Dakota, and Utah. The list for wheat contains 22 states and territories distributed in all parts of the United States. In the list for oats are 16 states; for barley, 15 states; for rye, 21 states; for buckwheat, 18 states; for cotton, only 1 state, Oklahoma, containing new land; for tobacco, only Wisconsin; for potatoes, 15 states, all in the potato belt; and for hay, 25 states and territories.

The foregoing presentation of the information that is possessed concerning the trend of agricultural production in this country in

comparison with population makes it plain that in spite of the fact that the United States is now passing through some of the early and middle phases of agricultural land exploitation, it nevertheless appears that the final stage of better agriculture and increased production per acre has been reached in many states for a varying number of crops, and that production per acre is not only beginning to exceed the normal increase of population, but really to exceed the actual increase.

The ability of the soil and of the agricultural arts and sciences to produce crops at a rate of increase greater than either the normal rate of increase of population or the normal as temporarily influenced by immigration, has been demonstrated times innumerable by the Department of Agriculture, by the experiment stations, and by intelligent farmers all over the country. The potentiality of agricultural production as a national achievement sufficient for growth of population has been so numerously and so thoroughly demonstrated as to be now beyond intelligent question. The Farmers' Co-operative Demonstration Work, now carried on in 12 cotton states, employs 375 traveling agents and has many thousands of demonstrating farms. It is proving by results on thousands of farms that preparation of the soil so as to make the best seed bed adds 100 per cent to the average crop on similar lands with an average preparation in the old way; that the planting of the best seed makes a gain of 50 per cent; and that shallow, frequent cultivation produces an increase of another 50 per cent, making a total gain of 200 per cent, or a crop three times the average crop produced on those farms where the plans and methods of the demonstration work have been adopted.

139. MISCELLANEOUS FEATURES OF MARKET SUPPLY[1]

There was a scarcity of potatoes free from sprouts this week and, as the call was fairly active, the market made slight gains.

During the middle of last week some dealers predicted that butter would gradually advance until it went to a maximum price of 27 cents, but the warehouse report on Tuesday, which indicated an excess of 19,000,000 pounds over a year ago, making a total of 82,844,000 pounds, had a stunning effect.

[1] Market comments gleaned from various newspapers, trade journals, etc.

Damage caused by floods in the most important Texas potato districts is giving an entirely new aspect to the old potato deal. Reports received during the last two weeks indicate severe damage by water and lead to the belief that the major portion of the Texas crop has been done away with. Farmers in the northern states hold the key to the situation. A survey of the warehouses throughout Michigan, Wisconsin, and Minnesota indicates that less than 10 per cent of total holdings are in the hands of dealers. With farmers still retaining almost all of the remaining potatoes in the North, the movement and prices depend entirely on their disposition to sell or hold.

Seattle jobbers and speculators are awaiting with considerable anxiety a decision from the Department of Agriculture at Washington regarding their application to permit the importation of Canadian potatoes, which would greatly undersell this market. Canadian potatoes can be bought in the vicinity of Vancouver and Victoria at $15 @ $18, with plenty of stocks on hand, but the horticultural laws prohibit entry because of a powdery scab. This week farmer holders of eastern Washington who have been asking $32 @ $35 per ton f.o.b., have been disturbed by reports, which they regarded as authentic, that a trainload of potatoes from Maine was about to be dumped on this market to sell at $25. Stock from so distant a point could not possibly be sold in competition with the local market, but holders took it so seriously that they began cutting prices of their own stocks to $30.

There is a decided improvement in the citrus fruit market throughout the country. Evidently the growers and shippers do not intend to glut the market with excessive shipments, as the movement last week was only nine cars more than the week previous. The growers no doubt believe that with a moderate movement from now on to the end of the season oranges will bring a fair price.

Very low prices continue to rule in the California orange market; in fact, values are running so low that some of the growers will get very little, if anything, back for their fruit. Some of the New York trade says that the ——— Exchange has too much fruit to sell. Offerings here and in other eastern markets are of poor quality because of their age. It has been held up too long, presumably because the exchange is topheavy with supplies.

Forty thousand bushels of onions were destroyed in a fire in the onion warehouse at Rensselaer, Indiana, on the night of March 19. The destruction of this large quantity of onions has made a material difference in the onion market, as it has wiped out over 80 carloads which were in fact the largest individual holdings in the state at the time. News of the fire had been out but a very short time when the leading operators were out buying up all the unsold stock they could get hold of, and the market has firmed up considerably, with quotations ranging from 5 cents to 10 cents per 100 pounds higher than a week ago.

Owing to the flood conditions which have prevailed in California during the past ten days or so, there has been a marked shortage in butter receipts on the Los Angeles market. The storage stock being practically cleaned up, there was little to depend upon except the fresh stock arriving in small quantities. As a result the market price reached a higher figure than at any time this season or last. Strange to say, the unfavorable conditions existing recently have had a tendency to lower the market on potatoes, as stock intended for eastern shipment could not be moved on account of railroad conditions, and a goodly amount has been diverted to this market. As a result there has been a temporary oversupply.

The car-lot potato situation at Minneapolis has been quiet, with receipts at loading stations practically nil and the movement out of the warehouses less than normal. Late last week a cold wave accompanied by heavy fall of snow was general throughout this and neighboring states, thus largely cutting off receipts from the growers. Prior to this cold spell, receipts had been liberal, which resulted in the market easing off 5 @ 10 cents from the high marks previously recorded. Operators are optimistic, however, declaring that the amount of stocks yet held and unsold warrant a firmer figure. This spirit of optimism has been augmented by reports coming in from stations and by the government's recent report of holdings in the northern states.

The rapid rise in the cabbage market has been the cause of considerable comment here (Chicago, April, 1915). Operators suddenly discovered that there was only a nominal amount of cabbage left in New York state, and, with the southern crop coming along slowly, the

supply was considerably less than necessary for the demand. From the middle of last week to the middle of this week prices jumped several times a day, and by the time the market opened this week New York operators were quoting cabbage as high as $36 a ton; reports were heard of one or two dealers who were even asking $40.

For a fortnight prior to the middle of this week potato prices have been steadily declining and as late as Tuesday of this week sales were made on the Chicago market at 80 @ 88 cents. Light receipts all this week began to take effect about Wednesday, and the market took on a firmer aspect. This is due largely to the shortage in insulated cars, only a few stations reporting that they had sufficient equipment to take care of requirements. Also there was a disposition on the part of farmers to haul less potatoes, owing to the fact that dealers had been dropping their prices at country points in accordance with the decline in the market. The conditions of roads in the North was bad, making it difficult for farmers to haul. Receipts continued light this week, and local operators expressed the belief that the market would make a sharp advance within the next week or two.

140. THE PRESENT DIFFICULTY OF THE SPECIALTY FARMER[1]

By G. HAROLD POWELL

There are approximately two hundred thousand acres of citrus fruits in California, representing an investment of $200,000,000. Eighty-three per cent of the total acreage in 1913 were oranges, and 17 per cent were lemons. Two-thirds of the groves were of bearing age in 1913; 85 per cent of these were oranges and 15 per cent were lemons. There are now 32,556 acres of lemons in California, 14,500 of which are of non-bearing age. When the non-bearing lemon groves come into bearing, the lemon production of the state, even with a moderate yield, will exceed the present total lemon consumption of the United States and Canada.

There has been a steady increase in the acreage devoted to citrus culture in California since the introduction of the Washington navel orange in 1873. In the ten years from 1903 to 1913, the citrus area

[1] Adapted from an address delivered before the Eleventh Annual Meeting of the Western Fruit Jobbers' Association, Los Angeles, February 16, 1915, printed in the *Western Fruit Jobber*, April, 1915.

increased from 83,657 acres to 191,357 acres, an increase of 128.9 per cent; oranges increased 138 per cent and lemons 82 per cent during this period. In the five years from 1908 to 1913, the total area increased 29.1 per cent, the increase for oranges and lemons being 23.3 and 67.6 per cent respectively.

The shipment of citrus fruits has also increased rapidly. The increase in five-year periods in the number of carloads of oranges and lemons is as follows: from 1895 to 1900, 225 per cent; 1900 to 1905, 71.5 per cent; 1905 to 1910, 10.9 per cent, and 48.5 per cent from 1910 to 1914. A normal crop now is 50,000 carloads, one-seventh of which are lemons. Of the oranges, approximately 63 per cent are Washington navels, 27 per cent Valencias, and 10 per cent miscellaneous varieties. The Valencia shipments have increased 60 per cent in 1914 and will increase rapidly in the near future.

There has always existed a fear since the beginning of the California citrus industry, lest the increase in production might outrun the increase in consumption; or, to state it differently, that there might be more citrus fruits produced than the people could consume at a price that would pay the producer. The total consumption of citrus fruits has increased in two ways: first, through the increase in population, and second, in the increase in the per capita consumption. The increase in population is not rapid enough to absorb the increase in the production of citrus fruits. The population of the United States increased 20.7 per cent from 1890 to 1900; the shipment of citrus fruits increased 195 per cent during the same period. From 1900 to 1910 the population increased 21 per cent, while the shipments increased 292 per cent during the same period.

In order to stimulate consumption and to insure a fair return on the investment, the industry has been obliged to eliminate speculative distribution by placing its own agents in the different markets of the United States and Canada. Searching investigation has also been made of the cultural and labor cost of production, in order that the industry may better understand its problems. It has organized on a co-operative basis the purchase of materials used in the packing-houses and in the groves, and it has secured the aid of the state and federal government in order that its business may be conducted economically, and the cultural and fruit handling difficulties that confront it may be solved by scientific research.

NOTE.—Much the same situation has confronted the producers of various other fruit and vegetable products—apples, peaches,

cantaloupes, strawberries, watermelons, onions, and potatoes—from time to time. Large acre profits have induced more and more specialization in the particular product, till at length the markets are swamped and the whole industry made unremunerative. If it be an annual crop, the difficulty soon rights itself by curtailment of acreage. But in the case of orchard products that have been five, ten, or even fifteen years in being developed, readjustment is more difficult.—EDITOR.

C. Some Phases of Cost of Production

141. DECREASING COSTS UNDER INTENSIVE METHODS[1]

BY LAWRENCE G. DODGE

The following table represents the usual expense of growing an acre of potatoes in Aroostook County, Maine, and in many parts of Michigan and Wisconsin. In fact, the second column of figures will represent the expense put into growing the crop in most localities where potato growing is carried on on a less expensive and thoroughgoing basis.

COST OF PRODUCING ONE ACRE OF POTATOES IN MAINE AND IN WISCONSIN

Cost of Supplies and Labor, with Rent of Land	Maine	Wisconsin	Cost of Supplies and Labor, with Rent of Land	Maine	Wisconsin
Plowing.....	$ 1.50	$1.25	Cultivating.....	$ 3.50	$ 1.90
Harrowing.....	0.50	0.25	Spraying.....	3.00	0.80
Fertilizing.....	24.00		Digging.....	6.00	2.10
Seed.....	5.00	2.50	Rent of land.....	15.00	5.00
Cutting.....	0.75	0.60			
Planting.....	0.75	0.60	Total.....	$60.00	$15.00

The more expensive method of growing potatoes usually gives a yield of 275 bushels or more to the acre. Unless an application of barnyard manure is made in addition to the expense estimated, at an added cost of from $5 to $10 per acre, the less expensive method rarely produces more than 125 bushels per acre and in a great many instances less than 100 bushels per acre. The increase in yield as a

[1] Adapted from *Farmers' Bulletin 365, United States Department of Agriculture*, pp. 20–22.

result of the more costly method is sufficient to more than pay the difference in cost, supposing potatoes to sell as low as $33\frac{1}{3}$ cents a bushel. One hundred and twenty-five bushels per acre grown at a cost of $15 per acre and sold at $33\frac{1}{3}$ cents per bushel yield a net profit of $26.66 per acre. Two hundred and seventy-five bushels per acre grown at a cost of $60 per acre and sold at $33\frac{1}{3}$ cents per bushel yield a net profit of $31.66 per acre. The second profit is $5 more per acre than the first.

A farmer in Van Buren County, Michigan, states that his potato crop, mostly marketed in the fall, sold at an average price of 44 cents a bushel for a period of ten years. At the latter price the more expensive method of culture would yield a profit of $61 per acre, against $40 from the cheaper method. Furthermore, some of the leading potato dealers of the North have stated emphatically that a better quality of potatoes is normally obtained with large yields than with small.

142. LOWER COSTS TO THE LARGE PRODUCER

Bulletin 97 of the Experiment Station of the University of Minnesota (published also as *Bulletin 48, Bureau of Statistics, United States Department of Agriculture*) presents figures for average costs of producing crops in three representative sections of Minnesota. The average size of the farms in the Halstad region was 210 acres, Marshall region 250 acres, and Northfield region 170 acres. Similar figures were secured from a single farm of 1,800 acres, typical of the large farms and extensive methods of grain growing found in the Red River Valley. Conditions of labor, size of fields, use of machinery, etc., cause it to differ considerably from the smaller sized farms in the same region.

COST OF PRODUCING CERTAIN CROPS IN MINNESOTA

	Barley (Spring Plowing) (Cost per Acre)				Oats on Fall Plowing (Cost per Acre)			
	Northfield	Marshall	Halstad	One Large Farm	Northfield	Marshall	Halstad	One Large Farm
Seed value	$0.966	$1.000	$0.750	$0.761	$0.962	$0.932	$0.600	$0.615
Cleaning seed	0.039	0.032	0.036	0.067	0.021	0.032	0.051	0.033
Plowing	1.110	1.063	1.148	0.878	1.230	1.094	1.137	0.839
Dragging	0.301	0.157	0.331	0.269	0.258	0.167	0.276	0.252
Seeding	0.244	0.261	0.262	0.212	0.241	0.251	0.258	0.231
Cutting	0.409	0.330	0.363	0.340	0.380	0.327	0.341	0.328
Twine	0.307	0.322	0.186	0.223	0.377	0.320	0.182	0.224
Shocking	0.149	0.131	0.137	0.158	0.158	0.145	0.130	0.127
Stacking	0.565	0.572	0.467	0.012*	0.767	0.649	0.457	
Stack-thrashing (labor)	0.534	0.259	0.198	0.731†	0.632	0.311	0.233	0.913†
Cash cost, thrashing	0.565	1.093	0.388	0.288	0.865	1.245	0.478	0.288
Machinery cost	0.446	0.356	0.344	0.228	0.446	0.356	0.344	0.228
Land rental	3.500	3.000	1.800	1.800	3.500	3.000	1.800	1.800
							0.027*	
Total	$9.135	$8.576	$6.410	$5.967	$9.837	$8.829	$6.314	$5.878

* Weeding. † Shock-thrashing.

143. INCREASING COSTS IN THE PRODUCTION OF BEEF[1]

By J. S. COTTON and W. F. WARD

The cattle-feeding business has changed greatly during recent years. Formerly steers from four to six years of age were fed in large numbers upon commercial feeds at yards near granaries or mills, or on large farms where only the roughage was grown. At the present time in the corn belt cattle are usually fed in small herds upon farms as a means of marketing farm products by converting them into beef, while the manure produced is utilized as a by-product for maintaining fertility. The cattle are marketed at eighteen months to three years of age.

A number of factors united to cause these changes. For instance, there has been a gradual increase in the value of farm products and the cost of farm operations. In the seven leading cattle-feeding states the prices of various feeds on December 1 of the years 1899 to 1901 and 1909 to 1911 have been taken, and during this ten-year period it was found that the price of corn had advanced 29 per cent and hay 45 per cent, while such supplemental concentrates as linseed-oil meal and cottonseed meal had increased in about the same proportion. The price of labor has advanced 31 per cent, and feeder steers have advanced 36 per cent since 1904.

This advanced price of feeder cattle is due to the decline in their supply, and several reasons are responsible for this falling off. Corn belt farmers found it unprofitable to continue the production of "native" steers at present prices of farm products, and so have turned to dairying or other types of farming. Likewise the supply of western range cattle was greatly curtailed by the exploitation of dry-land farming, which resulted in the best lands of the open range being taken up for grain-growing purposes. This shrinkage of the herds culminated in the excessive liquidation due to the drought of 1911–12. In the third place, we should realize that the increased demand for veal in this country has caused the slaughter not only of the surplus dairy calves, but of thousands of beef calves as well.

Lastly, the value of land has increased 103 per cent during the decade 1900 to 1910. This increase in land value makes a much larger capitalization upon which interest must be charged. All these

[1] Adapted from *Farmers' Bulletin 588, United States Department of Agriculture*, pp. 1–5.

items taken together make a heavy increase in the cost of feeding, with the result that many feeders have either curtailed their feeding operations greatly or else have stopped feeding entirely.

D. The Nature and Influence of Demand

144. THE NATURE OF DEMAND FOR AGRICULTURAL PRODUCTS[1]

By JOHN G. THOMPSON

Economists have long recognized that the nature of demand varies greatly with reference to different classes of commodities. One such distinction made is that between elastic and inelastic demand. Demand for a good is said to be elastic when that good is of such a nature that the demand is sensitive to price change or to a change in the purchasing power of the prospective buyer. If the price tends to fall, demand is immediately responsive and tends to increase. If, on the other hand, the price tends to rise, demand, again immediately responsive, tends to decrease. Where the demand for a good is inelastic, however, there is a lack of sensitiveness to price change and the demand will be influenced little or not at all.

Other things being equal, elasticity of demand is said to make for stability of price and inelasticity of demand for instability of price. Under normal conditions, as the price of a good characterized by elastic demand tends to rise, demand, being immediately responsive, tends to decline, thus checking the rise in price. If the price of a good of the same kind falls, under normal conditions demand immediately broadens and tends to check the decline in price. With a good characterized by inelastic demand, there is little or no check to such rise or fall in price.

Economists have further pointed out that elasticity of demand characterizes, in the main, those goods which we recognize as comforts and luxuries, while inelastic demand characterizes those classes of goods that we regard as necessities. A certain rather well-defined amount of the latter class of goods we want intensely, but once having secured this minimum of necessities, we become extremely indifferent about an additional supply.

[1] Adapted from "The Nature of Demand for Agricultural Products and Some Important Consequences," *Journal of Political Economy*, XXIV (February, 1916), 158–82

With reference to comforts and luxuries the matter is very different. If the price declines or if the purchasing power increases, those who were not able to buy and use comforts before will now come forward as purchasers, while those who want to enjoy their use more generously will purchase in larger amounts. Demand is thus expanded or narrowed as the case may be, and the market more or less supported as the case may be. Much more in the case of luxuries, desire, given proper variety, expands almost without limit as purchasing power increases or as prices decline. Under these circumstances the market for this class of goods has wide support. In case of higher prices or of lessened purchasing power, however, the demand shrinks throughout a wide circle. Rise in price is thus checked. In case of extreme or abnormal decline in purchasing power in periods of pronounced depression prices may fall decidedly with this price of goods.

II

The theorist in the economics of agriculture may well consider the importance of the distinctions thus pointed out by the general theorist in economics. It may be said in the first place that agriculture is, generally speaking, an industry which has to do with the production of the more absolute necessities of life, while the non-agricultural industries have to do, in the main, with the production of comforts and luxuries. If this be true—and in spite of important exceptions it is believed to be substantially true—the demand for agricultural products is, generally speaking, inelastic in character and that for non-agricultural products elastic in character.

With reference to food supplies as a whole, it is very evident that demand is relatively inelastic. Food up to a certain rather rigid limit is wanted imperiously and then any further supply for present consumption would be even objectionable. Storage of food supplies results in a better seasonal distribution in the consumption of foodstuffs and not of larger consumption of food in general.

With reference to any particular article of food in the consumption of which there is no fixed custom or habit there may be a considerable measure of elasticity of demand because of the possibility of the substitution of one article of food for another. Likewise in a country where food has been regularly cheap and plentiful wasteful habits with reference to its use may be reformed in periods of scarcity and high prices, thus appreciably lessening the total demand for food without

limiting actual consumption. According to recent government investigations the waste in families in the United States with incomes less than $800 per annum amounts to 3 per cent to 4 per cent, while in the case of families with incomes between $1,000 to $3,000 the waste frequently amounts to 10 per cent to 25 per cent. Not less, perhaps, is the waste in the marketing of produce—not to speak of the waste in harvesting, or of the waste which occurs through overeating. To take a single illustration, it is estimated that the loss by breakage and wastage in the marketing of eggs in the United States amounts to $50,000,000 annually.

It is easy to overestimate the amount of actual saving from such sources that may occur in times of straitened purchasing power, yet it can hardly be doubted that there is considerably less rigidity of demand with reference to the food supply of a people with a generous and even wasteful standard of living like our own than in the case of the peoples of Asiatic countries or, perhaps, even in Europe.

There is substantial proof of large increase in consumption of certain special articles of food, such as sugar, tea, raisins, tobacco, and some kinds of fruit. On the other hand, to offset these increases there is the decrease in consumption in more important articles of food. Meat is supposed to have constituted about one-half of the dietary of the people of this country in 1840, while by 1900 it had declined about one-third and has probably declined appreciably since. The consumption of corn as human food has also largely decreased in this country since early days—especially in New England and in the South—and wheat bread has been largely substituted for rye bread in Europe.

On the whole, therefore, such statistics as are available bear out the a priori conclusion that the consumption of food on the part of the human animal is relatively fixed in amount and that the demand for food as a whole is relatively rigid and inelastic.

This, however, does not prove that the demand for all agricultural products is practically fixed. The farmer is not engaged solely in the production of foodstuffs but to an important extent also in the production of textile fibers—not to speak of still other products of less importance. The demand for the textile fibers depends, of course, upon the demand for clothing; and the demand for clothing—especially in a country like our own—is decidedly elastic in character. In periods of high prices or of straitened purchasing power clothing can

be worn a little longer, or the individual may content himself or herself with less than the usual variety of suits or dresses or hats; or, again, the number of occasions for the display of wearing apparel may be reduced and thus the number of gowns or suits required be reduced. Some persons may be under the stern tyranny of fashion and make very great sacrifices rather than depart from their customary standard of dress. But there can be little doubt that, in general, the demand for clothing—and thus for the textile fibers—is much more elastic, in the downward direction, than that for food.

As between the two classes of commodities the demand in the upward direction is incomparably more elastic in the case of dress or clothing. While the demand for food simply disappears after the rather definite amount of food required is supplied, with increasing means or with lower prices for clothing fabrics there is normally a disposition to move in the direction of ever-larger demand or of ever-increasing expenditure for dress and personal adornment. Much of the increased use of raw material due to this expansive demand for dress has related to silk and flax—the former of which we do not produce at all and the latter of which we do not produce for textiles. Much of the increased use of raw material for dress, however, has related to cotton, and of this we are, of course, by far the most important producers.

The demand for hides in the manufacture of foot wear and other leather products contributes an element of elasticity of demand for cattle and other farm animals. On the whole, however, this demand is chiefly incidental to the demand for these animals for other purposes and is also met to an important extent, in this country, by the importation of large numbers of hides and skins.

Lastly, the demand for corn and oats in the maintenance of work-animals and for corn and potatoes in the manufacture of glucose, starch, and alcohol may be considered. The demand for feed for farm work-animals evidently depends, ultimately, upon the demand for farm products in general, and is therefore, on the whole, inelastic. The highly elastic demand for power in city activities today takes the form of a demand for a mechanical rather than animal power. Finally, the demand for corn and potatoes for the industrial purposes indicated, while relatively elastic in character, is yet very small in comparison with the relatively inelastic demand for the same products for other purposes.

III

Granted, then, the relatively inelastic character of the demand for farm products in general, what are the important consequences, theoretical and practical?

1. This characteristic of inelastic demand helps to explain why speculation finds such an important sphere of operations in the field of agricultural products. Speculation aims at making a profit out of price fluctuation, and, other things being equal, price fluctuation is in proportion to the inelasticity of demand for a good. It is true, of course, that farm products are subject to great variations in supply, and that this is also an important factor in explaining price fluctuations with respect to those products, and consequently in explaining speculation. But the inexorable character of the demand for these products, up to a certain point, and the almost total default in demand after this point has been reached, afford the necessary background and condition for variation in supply to work out its full effects with reference to price fluctuation. Relatively small surpluses and deficits in farm products have a relatively large effect on the price, and speculation is thus promoted.

2. It may be noted, in the second place, that since international trade in grain and in other farm products enables the crop deficits of one country to be offset by the crop surpluses of other countries, thus equalizing demand and supply for the world as a whole and thus affording a very considerable measure of elasticity of supply in the country or countries with crop deficits, tariff restrictions or other restrictions with reference to international trade in farm products necessarily emphasize the effect of inelasticity of demand and supply and thus greatly emphasize price fluctuation. Foodstuffs attain to famine prices in one country and decline to a low price level in other countries one year, and the following year the situation may be completely reversed. Speculative conditions are thus everywhere exaggerated. Spurred on largely to increase acreage by the excessive prices resulting from the shortage of one year, the agriculturists of the country are likely largely to overproduce under the probably more favorable crop conditions of another year. Discouraged, in turn, by excessively low prices, farmers will limit decidedly the acreage of the crop in question, and bad crop conditions and short acreage may again coincide, with the result of another series of famine prices—and so on indefinitely.

3. Another interesting result of the characteristic of inelastic demand for farm products is the fact that popular judgment, and even the opinion of authorities occasionally, with reference to the extent of the surplus or shortage of a particular farm product or of farm products in general is subject to sudden and violent change as well as to the wide departure from the actual facts in the case. Since a relatively small shortage in a farm product—particularly a food product—has a relatively large effect on the price, popular, and occasionally expert, opinion immediately jumps to the conclusion that the shortage must be proportional to the rise in the price. Similarly, with a relatively small surplus and a resulting relatively heavy fall in price, the immediate conclusion is that there exists a correspondingly heavy surplus.

145. THE ERRATIC PSYCHOLOGY OF DEMAND[1]

By GEORGE K. HOLMES

The growing, the preparing, and the marketing of many of the products of the farm are becoming questions of art and psychology. When people buy food, they buy it often not primarily for the gratification of taste, but upon the testimony of the eye, which is pleased with form and color, and upon the perception of odor, while, if the consumer was reared in the country, perhaps his choice is determined by the farm-bred fancies of a happy youth.

What set of nerves shall have the preference in determining the purchase of a farm product, the optic or the gustatory? Shall a thing be pretty, or delicious; and, since the sense of smell must also be consulted in some cases, is it of much consequence whether it is pretty or delicious? The seller has much more definite information with regard to these questions than the consumer; although it is the consumer who makes the choice, he is induced to do so by the seller's subtle knowledge of his fancies, which need not be and often are not either sensible or reasonable, but, on the other hand, often verge upon the notional, and seem superfluous to an unsophisticated farmer.

Butter is an article of food, and, as all but its makers and sellers believe, it is bought mainly for food reasons; yet, upon mental analysis, it appears that butter is not bought alone for its nutritive

[1] Adapted from "Consumers' Fancies," *Yearbook of the Department of Agriculture*, 1904, pp. 417–33.

value. But, surely then, it must be bought for its taste? Hardly so, if the commercial men know their business. As a matter of trade experience they know that the consumer gives almost as much weight to the combined testimony of the senses of sight and touch, and sometimes smell, as he does to the sense of taste. This will appear upon examining the butter score of excellence in use by the New York Mercantile Exchange and generally in use by dairymen.

Flavor, appealing to the gustatory nerves, has a weight of 45 points; the grain, body, or texture, which is perceived by the nerves of touch in the mouth, particularly those of the tongue, has a weight of 25 points; the salting, 10 points; the color of the butter, 15 points; and the style of the package, 5 points—altogether making 100 points, indicating perfect butter upon full scoring.

The nerves of taste influence the choice of the purchaser to the extent of only 55 per cent; to the nerves of touch in the mouth is granted an importance of 25 per cent; so that butter appeals to the mouth to the extent of 80 per cent of its attractions, the remaining 20 being offers to the favor of the eye.

For commercial purposes—that is, for the purposes of attracting and pleasing consumers—only 45 per cent of the perfection of cheese is regarded as appealing to the taste. Almost one-third of the total of excellence, or 30 per cent, is perceived by touch in the mouth, and 25 per cent, or one-fourth, is purely an appeal to the eye.

Horticulturists have been saying for years that in the so-called improvement of fruits we have generally failed to improve the quality. The most productive of cultivated blackberries are large and beautiful, but, as found in the market, are inferior in flavor when compared with the wild ones found along the roadside. As Professor Bailey has said, "the best market fruits are cultivated for a variety of features, as size and color of fruit, vigor, hardiness, and productiveness of the tree; quality is usually not considered. Quality and other characters of cultivated fruits appear independently of each other, and there is no true correlation between these characters."

Place a farmer and a city-bred man in the presence of a large variety of apples, and the farmer, very likely, will select for his eating such apples as a Rhode Island Greening, a Northern Spy, a Grimes' Golden, or a Jonathan, and the city man, governed in his choice by different sets of nerves, may select a Ben Davis, Baldwin, Stark, or Missouri Pippin. Taste is the fruit grower's principal test of an apple, if he has to eat it himself, but very different attributes are of

chief importance when he considers consumers in general, most of whom are townspeople.

In the city, a large city especially, the appearance of an apple is everything and taste nothing, unless the purchaser was once a country boy and enjoyed the freedom of an orchard. For some reason red is a leading favorite as an apple color in this country; indeed, there are some red apples that are miserably poor for eating purposes which sell for good, if not high, prices—the principal attraction to the consumer apparently being the red color, with subordinate attractions in smoothness and shapeliness.

The sale of corned beef, cured hams, sausage, and some salt meats of other descriptions is largely influenced by color, the popular prejudice favoring meat that has been cured and colored with the addition of saltpeter. Sausages and other forms of minced meats are also frequently colored by aniline dyes, as are the wrappers of smoked sausage and of ham. It is probable that commercial sausages of some varieties not so colored would find little sale in competition with the colored goods. [Note the bearing of pure food laws on this and similar points.—EDITOR.]

Yellow-skinned chickens have the preference in parts of this country as against those whose skin is more nearly white. This preference may be on account of the suggestiveness of fat beneath the skin, although, as a matter of fact, chickens store very little fat next to the skin, and then only in certain places, and certainly not on the legs; furthermore, the yellowness of the chicken's skin is inherent, and not derived from the fat beneath the skin. On the contrary, in some European countries the preference is for chickens with the lighter-colored skin.

A curious preference, entirely unassociated with taste, is the color of eggs. Brown eggs sell for a cent or two per dozen more than white eggs in Boston, and the contrary is true in New York. Let white and brown eggs be mixed, and a dozen of them will sell for less than a dozen of either assorted, and let one or two "dirties" be visible and the price goes still lower, although, as a matter of fact, in any case the contents of the eggs are of perfect quality and cannot be distinguished by taste, appearance, or nutritive value, one egg from another. Chicago is said to be undiscriminating with regard to color of egg shells, but San Francisco prefers white ones. In some markets where the brown egg is favored, as in those of England, it is said to be not uncommon to color shells of white eggs with coffee decoction or some dyestuff.

Butter and cheese are almost universally colored to meet the popular demand, and this demand varies so in different sections of this country that it is necessary for manufacturers and shippers to prepare their shipments especially for the section of country in which they are to be consumed; for instance, Washington demands a darker butter than Chicago, and New Orleans demands a color still darker than Washington.

One of the weaknesses of consumers is an admiration for foods that are polished or have a gloss, and this nickel-plate fancy plays some queer pranks with foods. The lifelong resident of the large city, for instance, who has no first-handed knowledge of an apple orchard, may buy from an apple woman at the street corner a pretty red apple with a wax-like polish on its surface secured by an application of saliva and a dirty rag. On the contrary, the apple-loving countryman, especially one who has come to be known as a "horticulturist," delights in the natural bloom of the apple.

Lettuce is one of the most fickle of plants in popular fancy. Different types are popular in different parts of the country. Sometimes the markets of cities only 100 miles apart will each call for types which would be unsalable in the other. In general, the clustering and crinkled-leaved varieties are more largely preferred than the smooth-leaved and heading sorts, and green sorts are preferred to those with brown, but some markets prefer the brown.

The firm-fleshed European sorts of cantaloupe are rarely seen. Americans prefer the softer although coarser-fleshed sorts. Carrots are not so largely used in this country as in Europe for table purposes, but when so used a deep orange color is wanted.

Whiteness of foods is so frequently the aim of the food producer and of the cook that some underlying cause would seem to be back of this. Perhaps it is because whiteness is so often an indication of cleanliness; at any rate, the eye is immediately to be pleased, let the source of the fancy be what it will.

In parts of England a white potato is preferred to one with a colored skin. A preference for the external whiteness of the potato does not seem to have arisen in this country, but its inside whiteness is admired at the dining-table when exceptionally pure.

Perfectly white beet or cane sugar is desirable and, since it has been found impossible to produce this by bleaching, a small amount of some blue substance, such as ultramarine, is added to neutralize the slightly yellow tint of the crystals.

The demand for whiteness, to which should be added plumpness, has pursued the delicious oyster until in some markets it has lost much of its flavor.

Flour made from cereals is perhaps the most conspicuous illustration of the consumers' insistence upon whiteness, and that the origin of this preference was in efforts to secure cleanliness in bread making is a suspicion, although it may have been due to the telltale dark color of bread made by the inexpert maker who allowed the dough to take too long a time in rising. Perhaps for one or both of these reasons grew the bread-maker's pride in the whiteness of her bread. Thus was enforced the housewife's demand for wheat flour that should make white bread. In the estimation of the old lovers of buckwheat cakes buckwheat flour has suffered because of the growing demand for whiteness. Formerly buckwheat flour was slightly brown and the buckwheat flavor was unmistakable and easily detected, but more recent milling processes have made this flour much whiter, and besides this the adulterator has not neglected the opportunity to promote the whiteness by combining with the buckwheat flour some cheaper and whiter wheat or corn flour.

Further pursuit of this subject is unnecessary to enforce the lesson that runs through the foregoing pages. Farmers should learn the whims and fancies of the markets that they reach, or can reach, and endeavor to meet those fancies. By so doing the highest prices and the largest profits may be obtained. If a farmer's products are such as go to customers who are whimsical or fanciful in their choice, and fall short of meeting such requirements, there is likely to be no profit in his operations. The farmer should not produce primarily to please himself and his own ideas of excellence; when he does so he may find a wide chasm between himself and the people whom he would like to have for customers.

146. DEMAND AND MARKET PRICE OF FRESH FRUITS[1]

By A. U. CHANEY

We must concede that the market price of any article is determined by the law of supply and demand. The demand, I believe, affects the price on fresh fruits more quickly than the supply. Then let us first discuss what influences the demand.

[1] Adapted from an address by the general manager of the American Cranberry Exchange, delivered before the Twelfth Annual Meeting of the Western Fruit Jobbers' Association, printed in the *Western Fruit Jobber*, February, 1916.

The demand for fresh fruits is influenced by weather conditions, quality and appearance, packing, container, advertising, stability of market, and the price.

The weather is often a greater factor than the price in creating or retarding the demand to an abnormal degree. For example—lemons, cantaloupes, strawberries, etc., are in greater demand when the weather is hot; whereas apples, cranberries, sweet potatoes, cabbage, etc., enjoy the greatest demand in cool weather. Ask almost any market expert to hazard an opinion as to the probable market price of fresh fruits, even as much as one week ahead, and he usually prefaces his answer by providing for weather conditions.

The quality and appearance of fresh fruit more easily influence the desire of the consumer than the price. The desire seems to be more easily created by sight than by taste. Quality and packing of fresh fruit are of such importance that proper standards of quality or grading of all varieties of fruit and produce should be established, either by the government or by growers' or trade organizations. Producers everywhere should be educated to the supreme importance of quality and appearance. Fruit should be picked in prime condition, and it should be stored and packed so that it will reach the consumer while it is attractive and sound.

Good packing influences the demand decidedly. The highest quality of fruit often has a large percentage of its value wasted by careless, improper packing, even though packed in proper packages. Much of the trouble is caused by lack of knowledge of how to pack properly. Especially is this true among small growers. Much of it is caused by growers' inability to secure experienced, trained packers. This is especially true in new producing districts. Some of the poor packing is caused by the lack of appreciation of the producer as to its importance, and coupled with this is his desire to pack cheaply, and such an offender usually disregards advice until he has tried out all markets and various sales agents in an effort to get full price for cheaper packing. To some degree every shipment of poorly packed fruit reduces the value of all receipts of similar fruit in the market that it reaches.

The container should be such as will best insure the safe transportation of its contents, be of convenient size, and be neat and clean in appearance, and when opened it should so display its contents as to attract the consumer's attention. The necessity of national standardization of containers is constantly growing in importance.

Standards of measure greatly vary in different states and communities. Shipments of the same commodity may reach a market like New York City on the same day from many different states, packed in almost as many different styles or sizes of containers, according to the custom or state law. Under such chaotic conditions proper prices can hardly be determined and unnecessary annoyance and waste of values are the natural result.

The advertising feature affecting demand is of more importance than many producers and dealers appreciate. The seasons for some of our very best fruits are short and often they are half over before a large part of the consuming public knows or realizes what fruits are "in season." A great many retail dealers fail to buy or display a variety of fruit until they begin to have call for it from the consumer. Often this is the sole cause of slack demand and abnormally low prices during the first part of the season. By advertising at the proper time in ways that will attract the notice of retailers and consumers, the demand is greatly increased.

The stability of market, when possible to secure it, I believe, goes farther toward encouraging the jobber and retailer to push sales and take special interest in a fresh product than anything else. It is my observation that the consumption of fresh fruit, perhaps more than anything else, increases according to the degree the sale is pushed. The rapidly increasing crops of fruits make it imperative that a demand be created that is far beyond the natural call. There is a vast difference between the sale of fruit which the dealer simply has for sale for those who come to inquire for it than there is for the fruit which the jobbers must dispose of by sending out salesmen to solicit orders from retailers, because, in addition, the salesman should inform the retailer as to what is in the market and what is due to arrive soon, and enthuse the retailer, in turn, to solicit the consumers' consideration.

The jobber and retailer are the natural acting salesmen for the producer, and on these salesmen's efforts the growers' interest depends. They are the necessary connecting links between the producer and consumer. The interest they take in pushing the sale of fresh fruits is naturally influenced by the certainty of their remuneration. The smallest liability to loss and the greatest certainty of a moderate profit interest them more quickly and certainly than the possibility of large profits, coupled with the danger of serious losses. The frequency of violently fluctuating values and heavy shrinkages make margins which

appear unreasonable necessary. Large corporations or organizations and close co-operation among both growers and jobbers in order to regulate the supply and distribution so that all fresh fruit and produce may reach the consumer while in prime, palatable, and attractive condition, would tend to establish this market stability, broaden distribution, increase the interest of dealers, greatly increase consumption, and reduce the present margin of profit or cost between producer and consumer more than any other system.

The price is perhaps the last, but not the least, item to consider in influencing demand. The desires for our fruits must first exist in the mind of the consumer, and then the price must be within his means to insure his purchase, and it must be in proper relation to values of competitive foods. The haphazard, random statements frequently appearing in the newspapers and magazines, that, at best, deal only in generalities and seldom touch the facts as applied to fruits, is one of the factors in destroying demand, because the consumer assumes through repeated reading that a commodity is high when in reality it is low. There is, however, always a high point in values, where, if it is reached, the consuming masses will turn to substitutes and a later reduction in price will seldom bring back the consumers' favor during that season. Marketing men generally understand the serious danger of a high price diverting consumption away from their product.

Example: During the cranberry season of 1912, I addressed the following query to two hundred retail dealers throughout the United States:

"Supposing the retail price of cranberries is $8\frac{1}{3}$ cents per quart, or 3 quarts for 25 cents, please state what reduction in your sales would result from advancing the price to 10 cents per quart, $12\frac{1}{2}$ cents per quart, 15 cents, and 25 cents?"

I received ninety-two replies, and from twenty different markets located in sixteen different states. The average of these replies showed that the estimated percentage of decrease of sales as price advanced was as follows:

Advance from $8\frac{1}{3}$ cents to 10 cents per quart reduced sales 12 per cent.

Advance from 10 cents to $12\frac{1}{2}$ cents per quart reduced sales 23 per cent.

Advance from $12\frac{1}{2}$ cents to 15 cents per quart reduced sales 37 per cent.

Advance from 15 cents to 20 cents per quart reduced sales 67 per cent.

This same inquiry was made by the Hon. J. A. Gaynor, of Grand Rapids, Wisconsin, a prominent cranberry grower, to one hundred retailers in the state of Wisconsin in 1906, with the following result:

Advance from 10 cents to 12½ cents per quart reduced sales 49 per cent.

Advance from 12½ cents to 15 cents per quart reduced sales 74 per cent.

The difference in these two sets of figures may be due to an increase of regular cranberry consumers by 1912.

147. INCREASING DEMAND AND RISING PRICES[1]

The increasing urban concentration of population has been an influential factor in the increase of prices of the commodities of common consumption. The significance of the city-ward drift of the population on the side of supply, in reducing the volume of agricultural production, has been pointed out elsewhere in this report. Not less potent is its influence in increasing the demand. City growth has unquestionably played a part in the advance of the cost of living. The great bulk of the population has been transferred from the ranks of food-producers in the country to the class of food-consumers in the city, and this at the same time has increased enormously the difficulty of distributing the food supply. The growth of the cities has also contributed to advance the cost of living in other ways than merely through the transfer of the population from the food-producing to the food-consuming class. Everybody knows the growing practice of living from hand to mouth, and buying in small quantities; extension of credit buying instead of cash purchases; the generally higher scale of living; and the inevitable temptations to spend and waste.

Finer and more varied food than heretofore is now generally demanded by the workingman, on account of an educated taste, and also, perhaps, because of the more general publicity as to what is consumed by the other classes. The result is an increased demand, which advances prices.

In former days garments were often worn until the color changed and the cloth became threadbare; nowadays the workingman discards

[1] Adapted from the *Report of the Massachusetts Commission on the Cost of Living*, May, 1910, pp. 491–95.

clothing long before these conditions appear. As is the case in the improvement of homes, so, naturally, the larger demand for clothing vastly increases the demand for materials and labor. The resulting scarcity of wool, for example, has greatly advanced its market price.

The general advance of the standard of living throughout all the ranks of the population, from the highest to the lowest, is manifestly one of the most potent causes of the increase of the demand for commodities, and consequently of the advance of prices. On every side the wants of the people have been multiplied and diversified. They demand more and better things. Their requirements are larger, more varied, and more exacting. The growth of the cities, the cult of fashion, the increase of leisure, and numberless factors have combined to bring about this advance of living standards. Rational extension and diversification of consumption are highly desirable. When, however, the change proceeds so rapidly as during the last decade, it accelerates greatly the upward movement of prices. The resulting increase of the cost of living is likely under these circumstances to produce a reactionary effect on the standard of living, causing the consumers to curtail expenditures, and thus to abandon the gains that have been briefly won. In short, the advance of the standard of living, if not rationally guided and safeguarded, threatens to bring about a later decline of the standard to a lower level.

148. SUBSTITUTION AS A FACTOR IN PRICE-MAKING[1]

By EDWARD T. PETERS

That the price of an article is influenced by the supply, not only of the article itself, but also of other articles which may be used in its stead, is a familiar principle of economics; but, owing perhaps to the insignificance of the rye crop of the United States, the influence of the rye supply upon the price of wheat does not seem to receive in this country the attention to which it is entitled. For the five years from 1895 to 1899, inclusive, rye formed 49 and wheat 51 per cent of the combined European crops of these two grains, and the European production of the two together formed 69.5 per cent of the world's production of the same two cereals. Of the world's production of wheat, however, Europe contributed only 55.5 per cent, whereas she contributed of the world's production of rye no less than 94.1 per cent.

[1] Adapted from "Influence of Rye on the Price of Wheat," *Yearbook of the Department of Agriculture*, 1900, pp. 167–82.

Nearly three-fourths of the world's rye crop is produced in two countries, namely, Russia and Germany; hence, if the rye crop of these two countries be added to the wheat crop of the world, there will be a much closer approach to the world's supply of breadstuffs than is made by taking the wheat crop alone; and comparison will show that in most cases there is also a much closer approach to a satisfactory explanation of the movement of prices in harmony with the law of supply and demand. This will sufficiently appear upon examining the accompanying table.

MOVEMENT OF SUPPLY AND AVERAGE EXPORT PRICE

Year	World's Wheat Supply	Wheat Supply plus Rye Crop of Russia and Germany	Average Export Price of Wheat in the United States	Increase (+) or Decrease (−) in World's Supply		Increase or Decrease in United States Export Price
				Wheat alone	Wheat plus Rye	
	Bushels	Bushels	Cents	Per Cent	Per Cent	Per Cent
1887.....	2,485*	3,530*	85.5			
1888.....	2,439	3,411	89.7	− 1.9	− 3.4	+ 4.9
1889.....	2,302	3,102	83.2	− 5.6	− 9.1	− 7.2
1890.....	2,377	3,327	93.3	+ 3.3	+ 7.3	+12.1
1891.....	2,435	3,163	102.6	+ 2.4	− 4.9	+10.0
1892.....	2,490	3,407	79.9	+ 2.3	+ 7.7	−22.1
1893.....	2,570	3,652	67.2	+ 3.2	+ 7.2	−15.9
1894.....	2,646	3,840	57.6	+ 3.0	+ 5.1	−14.3
1895.....	2,577	3,654	65.5	− 2.6	− 4.8	+13.7
1896.....	2,498	3,597	75.3	− 3.1	− 1.6	+15.0
1897.....	2,252	3,195	98.3	− 9.8	−11.2	+30.5
1898.....	2,982	4,046	74.8	+32.4	+26.6	−23.9
1899.....	2,762	3,976	71.8	− 7.4	− 1.7	− 4.0

*000,000 omitted.

Though 1891 shows an increase of 2.4 per cent in the world's wheat supply and 10 per cent increase of the price, the supply of breadstuffs for that year shows a decrease of 4.9 per cent, if the German and Russian rye crop be taken into account. Changes in price appear to occur in harmony with changes in the joint supply of breadstuffs, rather than with the change in the world's wheat supply alone.

The apparent anomaly of decreased supply and lower price in 1889 is simply an illustration of a particular phase of this same principle of substitution. Of the decrease in the world's wheat supply, the decrease in the Russian wheat crop accounts for 88.3 per cent, and the Russian decrease in wheat and rye accounts for 92.9 per cent of the falling off in the joint product of breadstuffs. Local scarcity

will affect general prices only in proportion as the general supply is drawn upon for relief. Now, there are districts in Russia in which, because of remoteness from lines of transportation or poverty which prevents its people from buying sufficient food, after bad harvests, scarcity exists unrelieved. Even though their rye crop was 166 million bushels short in 1889 and their crop of wheat 121 million bushels less, Russia exported in that year only 20 million bushels less of wheat than they had in the year following the abundant crop of 1888. The peasants were too poor to substitute this export wheat for their accustomed diet of rye bread. It may be added that the potato crop of 1889 was almost universally good, being about one-seventh greater than that of 1888.

In the following year, the potato crop fell off 300 million bushels (10 per cent) and the wheat crop increased 37 million bushels and rye 130 million. However, the export of both the latter rose by only 4 million bushels. The Russian peasant had a more abundant supply of black bread, but the white-bread countries did not get their wheat at a lower price. The effective supply at the centers of exchange was really smaller in 1890–91 than in 1889–90, notwithstanding that the wheat and rye crops of these years stood to each other in just the opposite relation.

149. MISCELLANEOUS FACTORS OF DEMAND[1]

In the last six months (March, 1916) New York state dried-apple interests have lost approximately $200,000, owing, for the most part, to the embargo placed on all foodstuffs formerly shipped to Germany. When we consider that before the war Germany bought two-thirds of all the evaporated apples packed in this country, the seriousness of the situation is apparent.

Monday's prices on California oranges were lower on all sizes and grades of fruit, decline on best stock amounting to fully 10 @ 15 cents per box and 15 @ 25 cents per box on other grades. This was accounted for by the extremely cold weather, which practically stopped the movement of fruit. This condition prevailed up till Thursday's sale, when the demand improved considerably and good stock showed an advance of 10 cents per box.

[1] Clipped from various newspapers.

$100,000,000 worth of material being supplied Europe by the manufacturers in the Pittsburgh district. $20,000,000 order placed by the Pennsylvania Railroad Company. This means that every able-bodied man in the Pittsburgh district will be employed. This means that each family will have cash to pay for fruits and vegetables. Ship to us!

Cold, damp weather had a very bad effect upon the California asparagus market this week. This is the coldest March New York people have experienced in a long time, and for western grass to move well at satisfactory prices, the weather must be warm.

At the present rate of movement it would take 200 days to dispose of all the apples now stored in western New York. According to that calculation, apples would not clean up until next August. But the demand for apples will stop long before that time. In fact, there is scarcely any demand for apples in June. The trade figures that it likes to get out of the deal by the end of April, but it usually takes well into May. It is almost impossible to prolong the movement after June 1, as fresh vegetables and fruits are plentiful and cheap by that time and there is not much demand for apples.

The strawberry market ruled easy this week. On Wednesday and Thursday the movement of Arkansas berries to this market increased from two to four cars to seven and nine cars daily, which was in excess of the demand at $3 per 24-quart crate, and prices paid on Thursday averaged $1.50 to $1.75 for the best fruit. At this price there was a good movement and the offerings were well cleaned up.

Dressed poultry receipts continue liberal, with a light demand, thereby causing an easy market. The quality is good and receivers are at a loss to understand the cause of such a light trade, and attribute it to general economic conditions. As stated before, there has been an enormous curtailment in the demand, owing to the shutting off of the ocean steamship business. Trade was fairly active on live poultry this week in a local way, but liberal receipts made lower prices necessary on fowls, which comprised the bulk of the arrivals. Dealers did not look for a pronounced decline, however, because of the presence of the Jewish holidays.

JEWISH HOLIDAYS FOR THE YEAR 5676

New Year, September 9 and 10, 1915.—Best market days, September 3–7. Kinds most in demand: fowls, turkeys, ducks, and geese.

Day of Atonement, September 18, 1915.—Best market days, September 13–16. All prime stock wanted, especially spring chickens and roosters.

Feast of Tabernacles, September 23 and 24, 1915.—Best market days, September 20–22. Kinds most in demand: fowls, ducks, and fat geese especially.

Feast of Law, September 30 and October 1, 1915.—Best market days, September 27 and 28. Prime quality of all kinds wanted.

Purim, March 19, 1916.—Best market days, March 14–17. Kinds most in demand: fowls and prime hen turkeys.

Passover, April 18 and 19, 1916.—Best market days, April 12–15. Kinds most in demand: turkeys, heavy fowls, fat ducks, and geese.

Last Passover, April 24 and 25, 1916.—Best market days, April 19–22. Prime quality of all kinds wanted.

Feast of Weeks, June 7, 1916.—Best market days, June 1–5. Good fowls especially wanted.

E. Some Agencies of Price Control

150. COFFEE "VALORIZATION" IN BRAZIL[1]

By LINCOLN HUTCHINSON

Rapidly increasing world demand, a wonderfully fertile soil, and cheap labor kept the Brazilian coffee industry in a flourishing condition down nearly to the close of the imperial régime in 1889. After the abolition of slavery and the establishment of the Republic, several factors contributed to prolong the prosperity. World demand continued to increase, virgin soil was still available, immigration supplied labor, and Brazilian currency was falling in gold value. The inevitable happened. Easy profits led to increased investments and careless methods. Little effort was made to cultivate intensively. Hand labor in cultivating, picking, washing, drying, hulling, polishing, sorting, packing, loading, remained in vogue, and planters fell into a luxurious absenteeism in the capital or in Paris.

The time came, about the beginning of the new century, when conditions changed. Supply passed demand, formidable surplus

[1] Adapted from "Coffee 'Valorization' in Brazil," *Quarterly Journal of Economics*, May, 1909, pp. 528–35.

stocks began to appear, prices, which had long been declining, fell to or below cost of production, Brazilian exchange reached bottom and began to rise rapidly. The conditions of the nineties were reversed, and planters began to turn to the banks for aid. A few far-seeing ones realized that the real remedy lay in the introduction of methods which should reduce the absurdly high cost of production, but they were unable to turn the tide. When bank assistance failed, demand was made for artificial checking of supply, and the government prohibited further planting. But results were small. The law was evaded to some extent; but, even if obeyed, it would have failed, for the improved methods employed by the few saner planters, and the coming to maturity of trees set out during the preceding decade continued to augment the crops.

The three coffee states have long been the chief economic and political centers of Brazil. Especially is this true of São Paulo, and São Paulo was the chief sufferer in the coffee crisis. Coffee-raising is almost its sole industry. Conditions demanded either reform in methods of production, with bankruptcy for the weaker planters, or further government assistance. The latter was the easier solution, and it was a political possibility. Soberer views might still have prevailed but for a new danger—the "bumper" crop of 1906–7. Brazilian production had risen slowly from 9,500,000 bags in 1899–1900 to 11,300,000 bags in 1905–6. Then it suddenly jumped to 20,000,000 at a time when there was already a surplus stock on the market of some 4,000,000 bags. Small wonder that the warnings of the wiser minority were unheeded, and that the coffee states, led by São Paulo, launched their valorization plan.

By this plan the states of São Paulo, Minas Geraes, and Rio de Janeiro agreed to purchase and hold for better prices enough coffee to keep out of the market all but a quantity sufficient to supply the world demand, which was estimated at 17,000,000 bags. Feeling that Brazil held a virtual monopoly of the trade, the advocates of the scheme maintained that this withdrawal of excess supply would at once force prices up to the minimum fixed by the government as the basis for their purchases or subsequent sales. This price was to be from 32 to 35 milreis per bag for Santos grade No. 7, with other grades in proportion. It was determined by an estimate of "reasonable profit" at existing cost of production.

Funds for the purchase were to be raised by a £15,000,000 loan on the credit of the states. Interest, amortization, and other charges

were to be provided for by a surtax on coffee exports of 3 francs per bag.

Difficulties immediately appeared. Capital was loath to back the scheme, and the loan could not be placed without federal guaranty, and this the federal government declined to give. São Paulo's two co-operating states grew timid and withdrew. The plan must be abandoned or São Paulo must act alone.

This the state decided to do. It began operation by the issue of treasury bills for £1,000,000. With the proceeds it purchased coffee and used this as the basis for loans the service of which was to be met by the surtax of 3 francs per bag. Rio de Janeiro and Minas Geraes supported the plan to the extent of imposing a similar tax, but they apparently took no part in the coffee purchases.

São Paulo also succeeded in placing loans of £1,000,000 with the Brasilianische Bank für Deutschland (soon afterward redeemed, however), £3,000,000 with the federal government, and later £3,000,000 with Schroeder & Co. of London, and the National City Bank of New York.

By the end of 1907 São Paulo had borrowed some $88,400,000, and had purchased, at rates about $1.22 per bag (of 132 pounds) above the market price, 8,357,500 bags of coffee. But prices failed to rise. In fact, they fell slightly. The existence of the huge government stock induced conservatism among dealers. Possibly, too, there were thrown on the market stocks which had been previously hoarded in anticipation of valorization. The proceeds of the surtax were insufficient to provide safely for interest, storage, commissions, amortization, etc. Attempts to dispose of portions of government holdings threatened further to demoralize the market. Creditors grew nervous and began to demand their money. São Paulo found itself unable to raise further funds on coffee collateral. Purchases had to be suspended, and valorization may be said to have come to an end by the beginning of 1908.

The results of the experiment were yet to be faced, however. São Paulo had incurred a heavy debt in the interest of the plan, and the state found itself the possessor of a huge stock of coffee for which it had paid at rates considerably above the market. World supplies continued to be about equal to world demand, in spite of a decline in the Brazilian crop to more normal proportions. Creditors were clamoring for liquidation.

The only escape from bankruptcy seemed to lie in a refinancing of the government obligations and a definite plan for realizing on the coffee holdings, and nearly the entire year 1908 was spent in negotiations having this end in view. These recently (December, 1908) reached a successful issue, but only after the federal government had come to the assistance of the state by granting an unqualified guaranty of a new loan of £15,000,000 to be used to refund the earlier obligations.

The essential features of this loan and the contract which accompanies it are:

1. The federal government indorses it with an unqualified guaranty.

2. The São Paulo coffee holdings, amounting now to 6,994,420 bags, are warehoused in New York and seven European ports, and warrants for them are deposited with specific banks, which act as trustees for the bondholders.

3. This coffee is placed under the sole control of a committee of seven residents of the United States or Europe, who are given full power over its liquidation, saving only a proviso as to minimum sales during the next ten or eleven years.

4. The state of São Paulo raises the surtax from 3 to 5 francs per bag, and guarantees the application of the proceeds to the sole purpose of satisfying the interest, amortization, etc., of the loan.

5. The state likewise agrees to restrict exports to 9,000,000 bags for 1908–9, 9,500,000 bags for 1909–10, 10,000,000 for succeeding years.

The placing of this loan marks the official end of the valorization experiment.

In summing up the general results, one must bear in mind both the state government and the planters. The credit of the state has suffered severely. No proof of this statement is needed beyond the fact of the extreme difficulty in raising the final loan and the insistence of the financial world that federal guaranty must be secured. Prior to 1906 the ability of São Paulo to meet its obligations seems to have been unquestioned, and it was borrowing freely for many sorts of permanent improvements. The direct financial loss, though extremely difficult to estimate, has in all probability reached a sum of several millions of dollars.

The results to the planter are somewhat clearer. Those whose coffee the government purchased undoubtedly reaped a financial

benefit. This benefit was not, however, equal to the excess of price over the market price, for a large part of the surtax on export must be deducted.

Other planters suffered to the extent of all that portion of the surtax which they were unable to shift, but, on the other hand, they, in common with all sellers, profited by the steadying of prices due to government purchases. The enormous crop of 1906–7 would unquestionably have demoralized prices, had not the state, or someone else, undertaken to hold the surplus. From whatever beneficial effect thus produced, must, however, be deducted the loss occasioned by the prevention of reactionary rise in price such as had always before followed periods of depression. The government's policy of giving preference in its purchases to the better grades of coffee stimulated efforts, already begun, to introduce improved methods.

The disposal of the surplus stock without too great disturbance to the market, yet rapidly enough to prevent deterioration or disproportionate storage and other charges, and the promise of the state government to restrict exportation in spite of increasing crops, present problems still full of menace to the industry. The placing of an import duty on coffee by the United States would ease the financial situation considerably by enabling the trustees to dispose of their accumulations in this country at a profit, but it would only increase the difficulties of the planters and the São Paulo government.

The whole experience serves to emphasize the dangers of government interference with industry. The state of São Paulo came to the rescue of its planters in a situation which the latter had created by their own shortsightedness. Possibly such action may be partly justified in view of the vast importance to the state of that particular industry. Possibly, too, it may be said to have been partly successful, provided the problems still remaining be solved without further disaster. Yet, even if partly successful, it has been so only at large direct loss to the state government, and serious impairment of its credit, and has encouraged producers to rely on government aid rather than their own efforts. It is safe to say that the coffee industry will not resume a normal and thoroughly satisfactory condition until the planters resolve to stand on their own feet. This will involve the introduction of better methods all along the line, the closer watching of the costs of production, willingness to accept low profits compared with those of ten and fifteen years ago, and the elimination of the weaker producers.

NOTE.—It may be added that the tying up of so large a stock of coffee as that which was held at New York under this valorization plan was looked upon by our Attorney-General as an improper restraint of trade. He accordingly began proceedings against the "coffee trust." The relation in which the Brazilian government stood to the whole scheme, however, made the situation not a little delicate. A satisfactory solution of the difficulty was afforded early in 1913, by the release and sale of the stock then held in trust in New York.—EDITOR.

151. INVOKING GOVERNMENT AID FOR COTTON PRICES[1]

Mr. Smith, of Georgia, secured consent, October 24, 1914, to introduce in the Senate of the United States the following bill:

A BILL (S. 6684) TO PROVIDE FOR THE PURCHASE OF 5,000,000 BALES OF LINT COTTON, AND FOR OTHER PURPOSES

Be it enacted, etc., That during the year 1915 a special excise tax is hereby levied, and shall be paid and collected not later than December of said year, upon every person, firm, or corporation engaging in the business of planting, growing, or producing cotton, said tax to be measured as follows:

Every such person, firm, or corporation shall pay a tax of 2 cents a pound upon all lint cotton produced or grown by such person, firm, or corporation in excess of 50 per cent of the total amount of lint cotton produced by such person, firm, or corporation in the year 1914: *Provided*, That where any such person, firm, or corporation was not engaged in the business of planting, growing, or producing cotton in the year 1914, such person, firm, or corporation shall pay a tax of 2 cents a pound on all lint cotton produced by such person, firm, or corporation in excess of 50 per cent of the total amount of lint cotton produced in the year 1914 on the farm or plantation operated by such person, firm, or corporation in the year 1915.

The Secretary of the Treasury is hereby authorized to make all necessary rules and regulations for the collection of the tax herein provided for.

SEC. 2. That the Secretary of the Treasury is hereby directed to have immediately prepared bonds of the United States to the amount in face value of $250,000,000. The said bonds shall be in denominations ranging from $10 to $500, and shall be made due on or before three years from date, and bear interest at 4 per cent per annum, and shall be payable in gold.

SEC. 3. That the said bonds shall be used at their face value for the purchase of 5,000,000 bales of lint cotton, payments to be made in said bonds to the sellers of such cotton, and the Secretary of the Treasury, the

[1] From *Congressional Record*, 63d Congress, 2d session, 18719–22.

Postmaster General, and the Secretary of Agriculture are hereby constituted a board with authority to conduct such purchases and to carry out the provisions of this act in connection with the purchase, handling, and sale of said cotton.

The said purchases shall be made exclusively from the producers of such cotton at the price not to exceed 10 cents per pound for middling lint cotton and shall be made as rapidly as possible. Other grades of cotton may be bought at prices higher or lower than 10 cents, based on the difference of their values, as the same are more or less valuable than middling cotton. The purchases shall be made in the States where the cotton is grown, and shall be prorated between the States, as far as practicable, according to the quantity of cotton grown in each State. The cotton so purchased shall be handled under the direction of the board hereinbefore provided for, and none of the same shall be disposed of earlier than January 1, 1916. During the year beginning January 1, 1916, said cotton may be sold in blocks of 100 bales or more at the market price. On and after January 1, 1917, so much of said cotton as has not already been disposed of shall, within six months thereafter, be sold by said board. The money received from the sale of said cotton shall be kept separately in the Treasury and shall be used to pay off the bonds provided for in section 2 of this act, and whenever $5,000,000 has been accumulated from the sale of said cotton, blocks of said issue of bonds shall be called in and redeemed, and said board is given full power and authority to make such rules and regulations as are necessary for the purpose of executing the provisions of this and the preceding sections.

SEC. 4. That after the cotton the purchase and sale of which is provided for in sections 2 and 3 of this act has been disposed of it shall be the duty of the said board to prepare a statement covering the entire expenditure by the Government in connection with said transactions, including the redemption of said bonds, and if any part of said expenses has not been met it shall be the duty of said board to officially report the amount remaining unpaid, and said report shall be filed with the Commissioner of Internal Revenue. For the year 1917, and annually thereafter, a special tax is hereby levied and shall be paid and collected during the months of August, September, October, November, and December upon every person, firm, or corporation engaging in the business of planting, growing, or producing cotton, said tax to be measured as follows:

Every such person, firm, or corporation shall pay on all cotton produced or grown by such person, firm, or corporation during each of said years an amount equal to 1 cent per pound on such cotton, and the same shall be payable before said cotton leaves the ginhouse: *Provided, however*, That if the report of said board filed with the Commissioner of Internal Revenue shows that no amount remains unpaid, the excise tax provided for in this section shall not be collected: *And provided further*, That no tax shall be

collected under this section except for the balance of the amount remaining unpaid as provided for in this section.

SEC. 5. That the sum of $1,000,000, or so much thereof as may be necessary, is hereby appropriated and made immediately available, under the direction of the said board, for the purpose of carrying into effect the provisions of sections 2 and 3 of this act.

MR. SMITH, of Georgia:—Mr. President, we have brought to the attention of the Senate certain facts which involve especially the welfare of twenty millions of people, citizens of our country, and the welfare of the entire country. We have shown to the Senate that the loss of our European market for cotton has left this country with a crop of 15,000,000 bales, and with a market of for 5,000,000 bales destroyed by the European war. We have shown that our own citizens have in no way been responsible for this condition; that it is not a normal case of overproduction and under-demand, but is a normal production with the demand destroyed by a foreign war. This bill varies but little from the amendment that was offered to the war-tax bill. The important change is that, instead of simply specifying 10 cents a pound as the price at which the government was to exchange the bonds for 5,000,000 bales of cotton, it provides that the exchange is to be made at the market price, not to exceed 10 cents a pound. In presenting it, I wish to say that, in my opinion, the withdrawal of 5,000,000 bales from the market would put the price on all the balance of the cotton at about 10 cents a pound. We brought to the attention of the Senate the fact that a week before war was declared in Europe middling lint cotton was selling for $13\frac{1}{2}$ cents a pound: that for the past five years it sold for an average of $12\frac{3}{4}$ cents a pound, and for the past ten years for over 12 cents a pound average.

152. CORNERING THE MARKET[1]

In the middle of April the price of wheat rose, after some weeks of spectacular advances, to war and famine figures. Millers actually in the Kansas wheat belt were forced to pay $1.50 per bushel. The Liverpool market recorded the highest price in thirty years. The Chicago price of $1.29\frac{1}{4}$ for wheat to be delivered in May has been exceeded only five times since the period of our depreciated currency. The exciting cause of this rocket advance was the speculation for the

[1] Adapted from the *American Review of Reviews*, XXXIX, May 1909, 529–30.

rise by Mr. James A. Patten, of Chicago, and his followers. Back of the manipulation by these daring speculators was a short crop in the Argentine Republic, due to December frosts, which reduced the amount of wheat that could be exported to feed Europe, the large needs of Europe itself, her short acreage, and probably the small supply of wheat on hand in the world left over from last year's harvest, though there are conflicting theories on this last point.

Getting a sense of this situation last fall, Mr. Patten bought during last winter and this spring some twenty million bushels of wheat to be delivered in May, paying probably, not much more than $1.00 per bushel. At the same time, opposing speculators who had not a correct sense of the situation were selling "short" wheat for May delivery as the price rose to figures which seemed to them more and more unjustified. When the short sellers became frightened at the apparent correctness of Mr. Patten's theories, and attempted hastily to buy in enough wheat to carry out their sales, the pyrotechnics of April resulted the more rapidly because of the farmers' unwillingness to sell until the top of the rising prices was reached.

With flour selling at $7.00 to $7.20 per barrel, numerous requests have been sent to Congress asking that a federal law should be passed prohibiting such operations as Mr. Patten's bulling of wheat "futures." If Mr. Patten is right in his assertion that the supply of wheat is inadequate to meet the world's demand, it is obvious that federal prohibition of speculation would have no final effect on the size and price of the consumer's loaf of bread. And if Mr. Patten is wrong, the history of attempts to "corner" wheat markets suggests that he and his fellow-speculators will certainly be overwhelmed by a flood of wheat coming from the farmers' stores to break the price which has been momentarily held at an artificially high level.[1]

153. BUYING TRUST AND PRODUCERS' POOL[2]

By ANNA YOUNGMAN

The farmer, both because of his situation and because of certain peculiarly distinctive features of agriculture, has usually been conceived of as a permanently isolated producer. Yet the farmer is not

[1] As a matter of fact, this speculative movement was carried to a successful conclusion. Subsequently, Mr. Patten engineered a similar corner in the cotton market. The Supreme Court decided that this latter enterprise operated in restraint of trade and was in violation of the Sherman Anti-Trust law.—EDITOR.

[2] Adapted from the *Journal of Political Economy*, XVIII, 34–44.

altogether unfamiliar with proposals to combine, nor has he always turned a deaf ear to pooling schemes which have been developed for his benefit. Lately the farmers in the tobacco-growing districts of Kentucky and Tennessee have been aroused against a monopoly, one of the most powerful of the industrial trusts, the American Tobacco Company. The farmers complain, whether justly or not, that each buyer confines himself to a particular region, so as not to compete with his fellow-buyers; that the prices at which the leaf will be purchased are agreed upon after conferences among the buyers; and that even the agents of foreign companies are in collusion with the American Tobacco Company. The farmers of Kentucky and Tennessee assert that this company, by its rank as buyer, can dictate the amounts that it will give for leaf, and they further allege that it has used its power to depress prices to so low a point that it has been made impossible for the tobacco grower to obtain a living.

Without doubt the price of leaf tobacco has fallen, but it is questionable whether the trust can be regarded as entirely responsible for that fall. Kentucky, which produced approximately 220,000,000 pounds of tobacco in 1890, raised over 314,000,000 pounds in 1900, and Tennessee increased its production nearly 13,000,000 pounds during the same period. Notwithstanding an increase in per capita consumption from 4.6 to 5.5 pounds, it is probably true that an excess of supply, quite as much as pressure exerted by the buying monopoly, was responsible for the marked drop in prices that occurred after 1900. Still, when the trust, or, more specifically, the tobacco trust, absorbs all of their buyers and buying agencies and constitutes itself purchaser of the farmer's product, he feels abused apart from any consideration of the actual injury done him. Here are many sellers and only one buyer. He sees no way of making effective his cherished ideal of competition. The only way to obtain an equality of bargaining power, therefore, is to diminish the number of sellers and, to the one powerful buying organization, to oppose a single salesmap. So, curiously enough, the farmers' movement has not been undertaken with design to crush the American Tobacco Company. Instead, an attempt has been made to emulate trust methods and thereby to demonstrate that the farmers' pool can be made a redoubtable opponent of the tobacco monopoly.

The first association of farmers in the dark tobacco district—the Planters' Protective Association—was organized at Guthrie, Kentucky, in 1904, and was incorporated as a mutual pool with a

capital of $1,000, divided into shares of $1 each. The farmer delivers his tobacco to the association prizer, who presses it in hogsheads for delivery to authorized warehouses. There it is sampled, and the sample sent to the nearest saleshouse and to the headquarters at Guthrie. Grades and prices are then put on the tobacco, and it is sold at these fixed prices by the salesmen for the association to all who wish to buy. The farmer is not permitted to make any individual selling contracts nor to dispose of his tobacco at a lower figure than the one fixed upon by the accredited grader.

The Planters' Protective Association has assisted the farmer in his efforts to obtain a higher price for his crop, in some instances doubling the size of his returns. An evidence of its growing success is the fact that, whereas it controlled only 40,000,000 pounds of the crop in 1904, it was enabled to obtain about 80,000,000 pounds of the crop of 1907.

Taking example by the experience of the Black Patch, the growers of Burley tobacco organized a similar association at Winchester, Kentucky, in January, 1907. The members of the association agreed to deliver their unsold crop of 1906 and the whole of their crop of 1907 to county boards to be deposited in warehouses and held until buyers met their terms. So great was the enthusiasm that the pool obtained about one-third of the crop of 1906 and over half the crop of 1907—about 100,000,000 pounds of tobacco in all.

The farmers secured loans on their warehouse certificates sufficient to satisfy their immediate necessities, and were ready to wait until the trust was prepared to meet the prices demanded for the pooled crops. In the fall of 1907 a conference was held, but the representatives of the trust believed at that time that they could get all the tobacco they needed at lower prices than the Burley society was willing to accept. With 100,000,000 pounds of unsold tobacco left on their hands, the farmers' situation would be hopeless when the 1908 crop began to come on the market. But there was one desperate remedy and the farmers agreed to take it. The members of the Burley society pledged themselves to raise no tobacco in 1908. The majority of them fulfilled that pledge, and the result was that the society finally succeeded in selling 75 per cent of its pooled crops to the American Tobacco Company at a "round" price of 17 cents a pound—nearly double the selling price of the leaf prior to the formation of the Burley Association.

F. The Mechanism of the Market as Influencing Prices

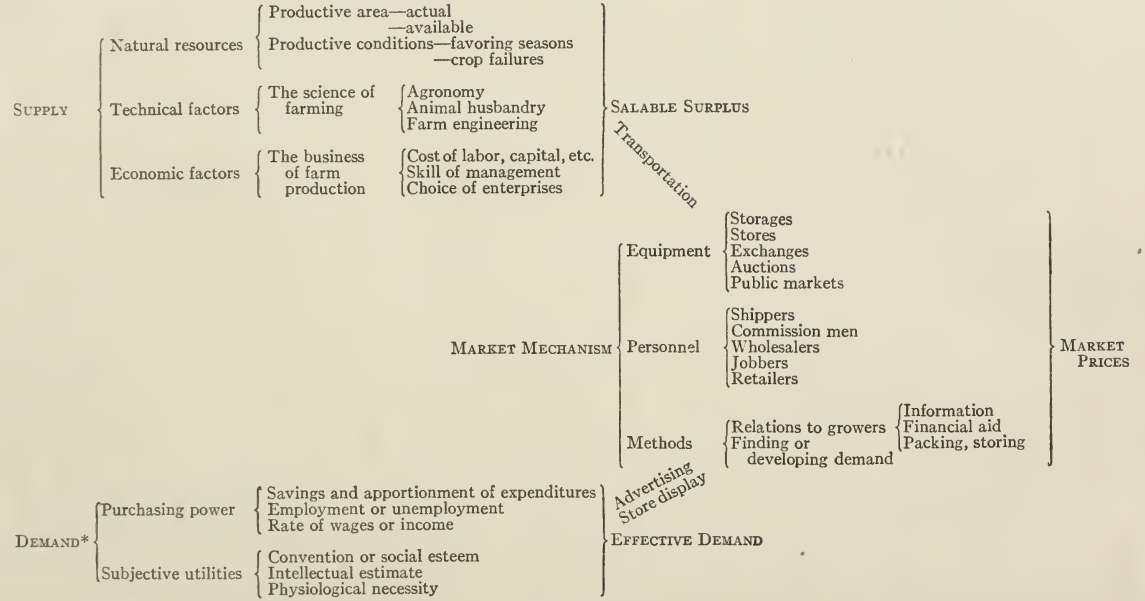
154. SUPPLY AND DEMAND BROUGHT TOGETHER THROUGH THE AGENCIES OF THE MARKET

The diagram on p. 486 is designed to show the central position occupied by our market mechanism as a mediating force between producers' supplies on the one hand and consumers' demands on the other. Beginning at the top of the diagram, and following it downward, we pass from natural determinants of what *can* be produced to rational determinants of what *shall* be produced. The "business of farm production" is very much influenced by the character and activities of the market. What a particular farmer or a given section decides to produce is based very much upon the willingness which marketmen have indicated to handle one or another class of product. Often the dealers give assistance, financial or other, in order to stimulate the production of some certain article. Transportation, while not strictly a marketing agency, yet occupies a highly important intermediate position, determining the possibilities of bringing any given demand within touch of any particular source of supply. We might say that it makes any actual stock an *effective* supply for such a market zone as it reaches.

If we turn to look at the matter from the side of demand, the important influence of the market mechanism again appears. Beginning at the bottom of the chart, we find demand resting upon conditions of physiological necessity which are fixed in character. But we see, as we look at the other factors in the making of effective demand, that there is a considerable field within which the agencies of the market are able to modify and direct the character and volume of actual market demand. The work of advertising, of making tempting displays of certain goods, or of selecting particular articles in whose interest the buying public is to be vigorously solicited—all these activities of the market go far to modify intellectual estimates or social esteem and to determine the distribution of the family income to various classes of expenditures or even the relative portion which shall be spent or which shall be saved.

We need to get away from thinking of the process of price-making in vague general terms and in the passive voice. It is a very concrete process, made up of a large number of personal transactions, and the precise conditions under which each of these personal transactions takes place are created by the activities of our marketing system.

154. SUPPLY AND DEMAND BROUGHT TOGETHER THROUGH THE AGENCIES OF THE MARKET



*Read from the bottom upward.

155. THE RÔLE OF THE CITY FOOD MARKET[1]

Chicago offers a typical illustration of the problem which every growing industrial city of the United States is facing today in larger or smaller measure. Here we have a large and rapidly increasing population made up of consumers who create a demand for the food products of the farm. On the supply side, we see Chicago in the midst of a great, fertile agricultural domain and at the center of an extensive and elaborate system of transportation, which puts her in commercial touch with producers of the goods she needs, wherever they find it advantageous to carry on such production. Adjustment of these two great forces becomes the problem of the day. If industrial America is to find it possible to take men from rural pursuits and gather them into town centers, in order to secure greater efficiency in manufacturing, more rapid progress in culture, or a richer social life, while, on the other hand, agriculturists are to be enabled to distribute their efforts over the earth in response to the call of natural advantages for production, there must be a system of provisioning the cities, which is swift, efficient, and economical.

It is our task to indicate the function which the market performs in determining the precise circumstances under which a particular demand is brought in touch with the sources of food supply all over the country and even in foreign lands. Only so can we get an understanding of the effect which these arrangements have upon the prices which Chicagoans pay for their purchases and that farmers receive for their products.

It is a favorite defense of the produce dealers to assert that their business is controlled absolutely by laws of supply and demand and that, therefore, if we are not satisfied with the results, we should get the city council to "repeal the law of supply and demand," rather than frame ordinances to control the commission merchant or the cold storage system, or to create a municipal market. Certainly we may admit, to a considerable extent, their claim as to the free operation of competitive demand and supply. Where great streams of goods converge upon a single market and a great concourse of buyers is brought together to bid and haggle and buy, the immediate price-making process is clearly that of mutual competition and an equilibrium of supply and demand. But to admit this, does not estop us

[1] Adapted from *The Chicago Produce Market*, an essay to be published shortly in the Hart, Schaffner & Marx series.

from our present inquiry. To urge it, is to beg the whole question which is the really vital issue for Chicago's consuming public.

For though the local supply and demand are made to strike a balance in price, the question still remains as to why it is that that particular supply and demand come together. The fact is that it is the market itself which determines whether shippers shall find it convenient and profitable to ship their goods to Chicago; it is the market which, by its alertness, finds neglected sources of supply or more direct, safe, and economical means of bringing goods to the city. Likewise, it is the market which, by reason of its quarters or its manners, attracts buyers or repels them, reaches all the demand or only part, educates taste, alters habits of consumption, creates and directs demand. Even if the market be passive in the working out of the particular supply and demand into prices, it is a highly active force in determining precisely what supply and what demand shall be brought together in the city of Chicago. And so we ask: Is our produce market rendering the best service at the lowest cost, or does it need a broader outlook, better equipment, and a different type of organization?

IX

MARKET METHODS AND PROBLEMS

Introduction

Here lies the happy hunting-ground of reformers. Every one of the main topics of this chapter has been or still is the basis of a controversy. From ultra-conservative defense of every practice which has become established, even accidentally, in the trade, to ultra-radical proposals for discarding all the old methods of dealing, evolved in the slow growth of our marketing system, each position has its champions. But it may not be out of place to suggest that the safest method of procedure is first to get an understanding of the precise way in which existing systems operate and of what have been the circumstances which have brought them into existence or permitted them to become established in use. One may then adduce evidence that new conditions have arisen which demand a new adjustment of marketing arrangements, or may point out wherein the old system has always failed to meet fully the needs of the situation.

With the ground cleared and the issues defined in this fashion there is larger hope that proposals of reform will go rationally to the real source of existing abuses and inefficiencies and that changes suggested will be both practicable and efficacious. The method of work outlined in selection 177 deserves careful consideration in this connection. It may also be suggested that the designer, whether of a building, an engine, or a market mechanism, needs to know the properties of the forces with which he must deal and be trained in the science of his craft. Whoever undertakes to construct a better market system must take due account of the principles of value and price if he is to bring about the price situations which he desires. It is for this reason that so lengthy a presentation of these subjects was made in the preceding chapter.

On the other hand, every theory must be rigorously checked up against the concrete facts of actual operating experience. For example, the attractive picture of the auction method of sale for a large part of our food supplies (selection 163) must not cause us to forget that actual attempts to extend the usefulness of this method

of dealing have met with only limited success. The fault is not with the theory of the open competitive market, but, apparently, in the inability or unwillingness of buyers to come to such a market place, or in the irregular supply or uncertain quality of the goods dealt in.[1] The same practical scrutiny must be given to the numerous plans for direct selling by producer to consumer. Likewise, the principle of co-operation is simple, briefly stated, and easily understood. But the practice of co-operation presents an unending series of problems of practical adjustment and readjustment.

This raises the question of co-operation on a large scale through the agencies of government. Section F presents several types of such endeavor. Did space permit, we should add also the New York system, under which commission dealers are bonded and licensed by the state and a state commissioner of food and markets not only supervises the activities of private dealers, but provides auction markets, to which producers can consign their goods. The issue is fairly drawn at the present time: Shall the government agency secure and furnish information, shall it assist producers to form marketing associations of their own, or shall it actually engage in the active operations of the market itself?

A. Organized Exchanges

156. FUNCTIONS OF PRODUCE EXCHANGES[2]

By S. S. HUEBNER

The produce exchange is not itself organized for the making of money, and does not fix prices or make transactions in the trade as an organized body. It is merely instrumental in affording a convenient market place, in regulating trade, and in disciplining the conduct of its members. The members act on their own responsibility, doing as much business as they like, provided they conform to the standards which the rules of the exchange prescribe for the regulation of the trade.

Practically all the exchanges have adopted disciplinary rules for the regulation of brokerage transactions, and the maintenance of a

[1] For an intelligent discussion of the limitations of the auction method, see Weld, *The Marketing of Farm Products*, chap. vii.

[2] Adapted from *The Annals*, XXXVIII, No. 2 (September, 1911), on "American Produce Exchange Markets," 321-41.

standard of commercial honor in the trade very much higher than would otherwise exist. The greatest care is exercised in electing members, and the new member must agree to abide by the constitution of the exchange and all subsequent amendments thereto. Expulsion is the penalty in case a member fails to comply with the terms of any business obligation or with the award of any committee of arbitration; or in case he deals in differences in the fluctuations of the market or is connected with any bucket shop. All orders must be executed in the open market and no customers' trades can be taken by members for their own account, either directly or indirectly, on pain of expulsion. Expulsion is also the penalty for making or reporting any false or fictitious purchase or sale, or for being guilty of bad faith, dishonorable mercantile conduct, or for any attempt at extortion; and when expelled no member may transact business upon the floor in his own name or through any broker or employee. No member is allowed, under any circumstances, to be both principal and agent in any transaction; nor may a member either by his own act or by the act of another member or broker be placed in the position of agent for both seller and buyer.

For the benefit of the trade the exchange regulates the inspection, grading, weighing, storage, and shipment of grain, the brokerage charges for the various services rendered, and the deposits necessary to secure the fulfilment of time contracts. Trade committees are appointed for the several kinds of produce, to decide disputes, and interpret the usages prevailing in each. Weighers and inspectors are appointed and licensed, and agreements are frequently effected with warehousemen and transportation companies. The rights of the respective parties in the various kinds of contracts are minutely prescribed; the settlement of such contracts is outlined in detail; and in case of insolvency, the method of procedure is carefully defined. Lastly, all business disputes are arbitrated quickly and cheaply. So high is the standard of the decisions of the committees of arbitration that they are often given the force of law by the highest courts.

Special reference should be made to the supervision of exchanges over the inspection, grading, weighing, and storing of produce, and the issuance of "general warehouse receipts" to represent title to the same. To make possible the convenient transfer of property from buyer to seller by the mere transfer of a receipt calling for a given amount of goods of a stated quality it is essential that all the factors preliminary to the issuance of such general receipts should be thoroughly supervised, so that the genuineness of their face value will go

unquestioned. This the exchanges are instrumental in doing. The system of inspection, grading, and weighing, which they have adopted with the assistance of the several state governments, has reached the highest standards. Next, the rules of the exchange look to the supervision of the storage of grain in the great collecting and distributing centers. According to the Chicago Board of Trade, the owner of an elevator whose holdings of grain can be delivered on contracts made on its floor must be of unquestioned financial standing, and his books are subject to examination by the committee of the exchange The elevator must be of the most improved character, properly situated, and with adequate transportation connections. The receipts of such a "regular" warehouse are acceptable as a delivery on exchange contracts.

This system of delivery by means of warehouse receipts gives to the grain, cotton, and produce they represent the same quality of mobility, for purposes of sale or deposit as collateral, as is given to corporate property represented by stocks and bonds listed on our stock exchanges. If it were not for organized markets and the existence of warehouse receipts, the vast quantity of produce lying in warehouses and elevators, aggregating hundreds of millions of dollars, would not be available for business purposes except in a very crude way. At present the greater part of the country's enormous crops is purchased from the farmer by warehouse and elevator men during the three or four months of the crop moving season, and is then gradually sold to the consuming public during the balance of the year. The farmers, as a rule, demand immediate cash payment, and this requires the expenditure of hundreds of thousands of dollars in excess of the available capital of the buyers. This in turn necessitates on their part extensive borrowing from bankers against so-called "grain paper." It is necessary for the buyers to transact the business on credit, and it is estimated that approximately nine-tenths of the country's grain and cotton crop is originally purchased with borrowed funds.

To illustrate, we will assume that a grain buyer with $100,000 of capital purchases 100,000 bushels of wheat for sale in the East. He desires to liberate his capital for new purchases long before he sells his present holdings. This he does by having his 100,000 bushels of wheat inspected, graded, and represented by a warehouse receipt or a bill of lading. He also has the same insured against loss by fire and "hedged" on some exchange against loss from a decline in price.

With this grain paper as collateral security the banker will grant him a loan to the extent of about 90 per cent of the value of the grain or $90,000 according to our assumption. Our grain buyer may immediately purchase another 90,000 bushels and, by the same process, borrow another $81,000 for further purchases. This operation might be continued until his original capital has been entirely or almost entirely absorbed in margins. This grain buyer has been enabled, through the ease with which grain can be rendered mobile under present exchange methods, to do a business seven or eight times as large as would be possible under other conditions. The farmer has been benefited in that he may dispose of his entire crop within a short time, and on a cash basis, irrespective of the immediate demands of the consuming world.

One reason why the bankers lend so readily on grain paper is because they know that grain always has a ready market on our produce exchanges, thus affording them ample opportunity, if necessary, to sell the grain held as collateral before the margin of 10 per cent on the loan is exhausted. During every hour of every business day, there is always present on our produce exchanges a group of brokers and speculators always ready to buy and sell, and so numerous as to furnish a continuous market where, in the course of a few minutes and with the sacrifice of only a small amount in the price, hundreds of thousands of bushels of grain may be either bought or sold. The existence of such a continuous market is greatly facilitated by the presence of a group of spectators who are willing to buy any supply that may be offered, because in their judgment a profit will be derived by selling it at a future time. The advantage of such continuous buying to the dealer or to the banker has just been explained; but a continuous market throughout the year and at reasonably steady prices is essential to the farmer also. As stated, farmers realize upon the larger part of their crops shortly after harvest, and were it not for the large group of buyers who are always willing to take the grain with a view to storing it and selling it for future delivery, it would necessarily follow that prices would fall extremely low at harvest. Mr. Merrill, president of the Chicago Board of Trade, suggests that "the testimony of all large grain merchants is that formerly the price of handling grain averaged six, eight, and ten cents a bushel, instead of an average of a two-cent margin at the present time." Or it may happen, as Mr. Merrill explains, that "the farmer may have his crop still in the ground, or he may have it upon his farm awaiting a time

when the roads are in a condition to bring it to market, or he may have it stored in an elevator at his own expense waiting for a better price—yet in each of these cases he can, and usually does, dispose of his surplus crops by selling them through a broker upon some board of trade for delivery at some future time."

Produce exchanges also serve as a world's clearing house for trade and crop information, and in this respect render an invaluable service to producer, middleman, and consumer. All our leading crops are produced over such large areas that few individuals have it in their power to keep in daily touch with current crop and trade events except it be in their own particular locality. The prices of nearly all leading cereals are determined by national or world-wide conditions, and a favorable or unfavorable condition of a crop in one locality or country may be so outweighed by the opposite condition elsewhere as to render worthless a price quotation based upon local evidence.

Today, however, all the leading produce exchanges are in constant touch with crop conditions, weather reports, the movements of grain, changes in freight rates, the rate of consumption, economic legislation, political complications, etc.; and all this information as currently received is given immediate expression in the form of purchases and sales at prices which are immediately transmitted by wire to all the trade centers, and soon made available to the general public by the daily press.

The value of this prompt and elaborate collection of trade information is fourfold, viz.:

1. *It makes possible the discounting of the future*, i.e., it enables dealers and speculators to exercise their best judgment at once in the form of actual transactions, and thus the effect of a short or bumper crop upon prices is reflected, i.e., discounted, long before it would otherwise be realized by the general public.

2. *It steadies prices.*—The daily discounting of current events makes unnecessary, except in rare instances where manipulation has interfered with the smooth working of the organized market, a sudden decline or rise in prices upon the wide publication of events which have been slowly developing. An elaborate statistical study of prices for forty years, one-half of which period was before the time of exchanges, shows clearly that the fluctuations in the price which the farmer received for his grain or cotton was not nearly so great during the twenty years when exchange markets were in operation as it was prior to their existence. The middlemen who handle the crops use

the speculative market to eliminate the risk of price fluctuations by unloading that risk upon a group of speculators instead of on the producer, and thus can give the farmer the best price.

Without an organized market the farmer would not know the price of his grain from day to day, because transactions, if private, would not be recorded, might be designed to mislead, and certainly would not be representative of the general judgment. He would be exposed to a hundred times the fraud of today, when every newspaper of any importance in the country gives daily produce quotations for the day before.

The tendency toward steadying price movements is also facilitated by the operations of the bear crowd. Short-selling is often of the greatest benefit in repressing rampant speculative enthusiasm on the one hand, and in checking the effect on prices of excessive pessimism on the other. If it were not for the group of short-sellers who resist an excessive inflation, it would be much easier than now to raise prices through the roof; and then, when the inflation became apparent to all, the descent would be abrupt and likely unchecked until the basement was reached.

3. *It helps to regulate the rate at which the year's crop is consumed.*— The modern grain and cotton markets are so organized today that the distributing interests in the trade are constantly informed as to the "visible supply" on hand, which may be defined as being all grain, or any given kind of produce, which is stored in warehouses, elevators, cars, or boats, and which is available for purchase. Owing to the fact that warehouses in all the important distributing centers are regulated by law or by the rules of the local board of trade, or both, it is possible to collect data periodically as to their holdings. These statistics are published regularly in the form of visible supply tables and, when viewed in connection with similar statistics of former years, will serve as a guide in fixing the price, and by doing this exert an effective influence in regulating the consumption of the crop. If the visible supply, plus the known stocks of grain still in the farmer's hands, is unusually low, it is likely under normal conditions that the price will be bid up and consumption decrease, and if unusually large, it may be expected that prices may decline and consumption increase. In this way the movement of prices will indirectly benefit the community by regulating consumption so that each year's crop, whether large or small, just happens to meet the needs of the consuming world.

4. *It serves to level prices between different markets.*—Reference is had here to the practice of "arbitraging" between markets. Arbitraging may be defined as the making of two transactions, one a purchase and the other a sale, in different markets or in the same market between two different subjects of trade, at about the same time, with a view to shaving a profit because the price in the one market, or the one subject of trade, is lower than in the other. If the arbitrageur knows that wheat is selling lower in Minneapolis than Chicago by an amount greater than he thinks ought to be the case, in view of transportation and other charges, he can use the low market for making an actual purchase of wheat, and at the same time use the high market to sell short an equal amount for future delivery during some convenient month. He may then transport the wheat from the low market to the high market and deliver the same in fulfilment of his short sale. Or it may happen that at a given time the quotations for wheat on the Minneapolis Chamber of Commerce and the Chicago Board of Trade may be "out of line," i.e., the difference between the two prices may be an unnatural one in view of the cost of transportation and handling which must be taken into account in moving grain from one city to the other. In that case the arbitrageur, feeling sure that this unnatural difference must soon right itself, may buy a future in the low market, selling the same amount short for future delivery in the high market. Then, *if the two prices come together*, he can close out both of these transactions, and net as a profit the amount represented by the extent that the two prices have come together minus, of course, all expenses. Through their constant watchfulness all leading markets are kept "in line" with one another. Grain, like water, will seek its level. It will move from the center where it is plentiful to where it is not plentiful. Instead of chaos we are given a harmonious relationship between different markets, between grades, between the several monthly delivery periods, and even between different kinds of grain.

157. RULES FOR THE GRADING OF GRAIN[1]

RULE I—WINTER WHEAT

No. 1 White Winter Wheat shall include all varieties of pure soft white winter wheat, sound, plump, dry, sweet and clean, and weigh not less than 58 pounds to the measured bushel.

[1] Prescribed by the State Public Utilities Commission of Illinois. In force on and after July 1, 1914.

No. 2 White Winter Wheat shall include all varieties of soft white winter wheat, dry, sound and clean, and shall not contain more than 8 per cent of soft red winter wheat, and weigh not less than 57 pounds to the measured bushel.

No. 3 White Winter Wheat shall include all varieties of soft white winter wheat. It may contain 5 per cent of damaged grains other than skin-burnt wheat, and may contain 10 per cent of soft red winter wheat, and weigh not less than 53 pounds to the measured bushel.

No. 4 White Winter Wheat shall include all varieties of soft white winter wheat not fit for a higher grade in consequence of being poor quality, damp, musty or dirty, and shall not contain more than 10 per cent of soft red winter wheat, and weigh not less than 50 pounds to the measured bushel.

No. 1 Red Winter Wheat shall be pure soft red winter wheat of either or both light and dark colors, sound, sweet, plump and well cleaned, and weigh not less than 60 pounds to the measured bushel.

No. 2 Red Winter Wheat shall be soft red winter wheat of either or both light and dark colors, sound, sweet and clean, shall not contain more than 5 per cent of white winter wheat, and weigh not less than 58 pounds to the measured bushel.

No. 3 Red Winter Wheat shall be sound, soft red winter wheat of either or both light and dark colors, not clean or plump enough for No. 2, shall not contain more than 8 per cent of white winter wheat, and weigh not less than 55 pounds to the measured bushel.

No. 4 Red Winter Wheat shall be soft red winter wheat of either or both light and dark colors, shall contain not more than 8 per cent of white winter wheat. It may be damp, musty, or dirty but must be cool, and weigh not less than 50 pounds to the measured bushel.

No. 1 Hard Winter Wheat shall include all varieties of pure, hard winter wheat, sound, plump, dry, sweet and well cleaned, and weigh not less than 61 pounds to the measured bushel.

No. 2 Hard Winter Wheat shall include all varieties of hard winter wheat of either or both light and dark colors, dry, sound, sweet and clean, and may contain not more than 25 per cent of soft red winter wheat, and weigh not less than 59 pounds to the measured bushel.

No. 3 Hard Winter Wheat shall include all varieties of hard winter wheat of either or both light and dark colors, not clean or plump enough for No. 2, and may contain not more than 25 per cent of soft red winter wheat, and weigh not less than 56 pounds to the measured bushel.

No. 4 Hard Winter Wheat shall include all varieties of hard winter wheat of either or both light and dark colors. It may be damp, musty or dirty, and may contain not more than 25 per cent of soft red winter wheat, and weigh not less than 50 pounds to the measured bushel.

RULE II—SPRING WHEAT

(Includes Hard Spring Wheat, Northern Spring Wheat, Spring Wheat, White Spring Wheat, Durum Wheat, and Velvet Chaff Wheat.—EDITOR.)

RULE III—WESTERN RED, WHITE AND HARD WHEAT

(Applies to wheat grown in the states of Montana and Idaho, and on the Pacific slope, except where the quality of this wheat is substantially the same as that of wheat grown in more easterly territory.—EDITOR.)

RULE IV—MIXED WHEAT

MIXED WHEAT—In case of an appreciable mixture of hard and soft wheat, red and white wheat (except as provided in the rule of hard winter, red winter, white winter and Northern spring wheat), durum and spring wheat, any of them with each other, it shall be graded according to the quality thereof, and the kind of wheat predominating shall be classed as Nos. 1, 2, 3, and 4 mixed wheat, and the inspector shall make notation describing its character.

RULE V—CORN

The following maximum limits shall govern all inspection and grading of corn:

GRADE CLASSIFICATION WHITE, YELLOW, AND MIXED CORN	MAXIMUM PERCENTAGES OF			
	Moisture	Damaged Corn	Foreign Material Including Dirt, Cob, Other Grains, Finely Broken Corn, etc.	"Cracked" Corn, Not Including Finely Broken Corn (See General Rule 9)
No. 1	14.0	2*	1	2
No. 2	15.5	4*	1	3
No. 3	17.5	6*	2	4
No. 4	19.5	8†	2	4
No. 5	21.5	10††	3	5
No. 6	23.0	15¶	5	7
"Sample"	See General Rule No. 6 for Sample Grade			

* Exclusive of heat damaged or mahogany kernels.

† May include heat damaged or mahogany kernels not to exceed ½ per cent.

†† May include heat damaged or mahogany kernels not to exceed 1 per cent.

¶ May include heat damaged or mahogany kernels not to exceed 3 per cent.

GENERAL RULES

1. The Corn in Grades No. 1 to No. 5, inclusive, must be sweet.

2. White Corn, all grades, shall be at least 98 per cent white.

3. Yellow Corn, all grades, shall be at least 95 per cent yellow.

4. Mixed Corn, all grades, shall include corn of various colors not coming within the limits for color as provided for under white or yellow corn.

5. In addition to the various limits indicated, No. 6 corn may be musty, sour, and may also include corn of inferior quality, such as immature and badly blistered.

6. All corn that does not meet the requirements of either of the six numerical grades by reason of an excessive percentage of moisture, damaged kernels, foreign matter or "cracked" corn; or corn that is hot, heat damaged, fire burnt, infested with live weevil, or otherwise of distinctly low quality, shall be classed as sample grade.

7. In No. 6 and sample grade, reasons for so grading shall be stated on the inspector's certificate.

8. Finely broken corn shall include all broken particles of corn that will pass through a perforated metal sieve with round holes nine-sixty-fourths of an inch in diameter.

9. "Cracked" corn shall include all coarsely broken pieces of kernels that will pass through perforated metal sieve with round holes one-quarter of an inch in diameter, except that the finely broken corn as provided for under Rule 8 shall not be considered as "cracked" corn.

10. It is understood that the damaged corn; the foreign material including pieces of cob, dirt, finely broken corn, other grains, etc., and the coarsely broken or "cracked" corn, as provided for under the various grades, shall be such as occur naturally in corn when handled under good commercial conditions.

11. Moisture percentages, as provided for in these grade specifications, shall conform to results obtained by the standard method and tester as described in Circular 72, Bureau of Plant Industry, U.S. Department of Agriculture.

(Rules VI to X, inclusive, deal with Kaffir Corn, Milo Maize, Oats, Rye, and Barley, respectively.—EDITOR.)

RULE XI—GENERAL RULES—SAMPLE GRADES

All wheat, barley, oats, rye and corn that is in a heated condition, souring or too damp to be safe for warehousing, or that is badly bin-burnt, fire burnt, fire smoked, or badly damaged, mixed with garlic, onions, or containing live weevil, exceedingly dirty, or where different kinds of grain are badly mixed with one another, shall be classed as Sample Grade, and the Inspector shall make notations as to quality and condition.

RULE XII—FEES FOR INSPECTION

THE CHIEF INSPECTOR OF GRAIN is hereby authorized to collect on all grain inspected under his direction as follows:

FOR IN-INSPECTION: 50 cents per car load; 10 cents per wagon or cart load; 50 cents per 1,000 bushels from boats; one-quarter of a cent per bushel from bags.

For Out-Inspection: 50 cents per 1,000 bushels, and 10 cents per wagon load to teams.

Note—The inspection department shall, in no case, make a grade of grain above that of the poorest quality found in any lot of grain inspected, when it has evidently been plugged for the purpose of deception, or otherwise improperly loaded.

Note—Wheat which has been subjected to scouring, or clipping, or any process equivalent thereto, shall not be graded higher than No. 3.

Note—Spring Wheat, which if cleaned would be good enough to grade No. 1 hard, No. 1 or No. 2 Northern, No. 1 or No. 2 Velvet Chaff, No. 1 or No. 2 Durum, and all mixtures of these different varieties of Spring Wheat that would, if cleaned, grade No. 2 or better, shall be given these grades, subject to a dockage per bushel equal to the weight of the dirt, seeds and foreign grain that would have to be removed by cleaning in order to entitle the wheat to the grade given it. The dockage to be ascertained in the customary manner by the use of sieves.

Note—The word "NEW" shall be inserted in each certificate of inspection of a newly harvested crop of oats until the fifteenth day of August; of rye, until the first day of September; of wheat, until the first day of November, and of barley, until the first day of November of each year.

This change shall be construed as establishing new grades for the times specified, to conform to the existing grades of grain in all particulars (except the distinctions hereby established between the new and the old crop), and shall apply to grain inspected from store for two months after the time respectively above specified.

Note—All inspectors shall make their reasons for grading grain, when necessary, fully known by notations on their records. The weight alone shall not determine the grade.

Note—All inspectors must ascertain the weight per measured bushel of each lot of wheat inspected by them and report the same in their records.

John P. Gibbons, *Chief Inspector of Grain*

158. THE MEANING OF "BASIS" CONTRACTS[1]

Sec. 3. On contracts for grain or flaxseed for future delivery the tender of a higher grade of the same kind of grain or flaxseed than the one contracted for shall be deemed sufficient. All contracts made for Wheat hereafter, unless otherwise specified, shall be understood as for "Contract" wheat, and on such contracts a tender of No. 1 Red Winter Wheat, No. 2 Red Winter Wheat, No. 1 Northern Spring Wheat, No. 1 Hard Winter Wheat, or No. 2 Hard Winter Wheat, and

[1] From Rule XXII of the Chicago Board of Trade.

on and after July 1, 1913, No. 1 Velvet Chaff Wheat, in such proportions as may be convenient to the seller, subject, however, to the provisions of Section 5 of Rule XXI, shall be deemed a valid tender.

For delivery on and after July 1, 1914, all contracts for corn, unless otherwise specified, shall be understood as for "contract" corn and on such contracts a tender of the following described grades of corn in such proportions as may be convenient to the seller, but in no case an amount less than 1,000 bushels of any one grade in one elevator, shall be deemed a valid tender at the price differences mentioned in the following schedule, subject, however, to the provisions of Section 5 of Rule XXI:

No. 1 White Corn
No. 2 White Corn
No. 1 Yellow Corn
No. 2 Yellow Corn
} at ½ cent per bushel over contract price.

No. 1 (Mixed) Corn
No. 2 (Mixed) Corn
} at contract price.

No. 3 White Corn
No. 3 Yellow Corn
} at 2 cents per bushel under contract price.

No. 3 (Mixed) Corn—at 2½ cents per bushel under contract price.

No. 4 White Corn
No. 4 Yellow Corn
} at 4½ cents per bushel under contract price.

No. 4 (Mixed) Corn—at 5 cents per bushel under contract price.

Provided that No. 4 Corn of the new crop can be delivered only during the months of November, December, January, and February.

The above grades of corn to conform to the standards established by the U. S. Government effective July 1, 1914.

All contracts for oats, unless otherwise specified, shall be understood as for "Contract" oats, and on such contracts a tender of No. 1 White Oats, No. 2 White Oats, No. 3 White Oats, or Standard Oats, in such proportions as may be convenient to the seller; subject, however, to the provisions of Section 5 of Rule XXI of the Rules of the Board of Trade of the City of Chicago, shall be deemed a valid tender of "Contract" oats; provided, however, that No. 3 White Oats can be delivered as "Contract" oats only at a deduction of five cents per bushel from the contract price.

159. HEDGING TO PROTECT TRADE PROFITS[1]

By HENRY CROSBY EMERY

The trader is primarily concerned with getting a profit from differences of price in different markets. He buys in the producer's market and sells in the consumer's. This difference between markets is constant and normal, and constitutes the reward for the services of the middleman. To insure such normal profits, their desire is to escape the risks of fluctuation within the *same* market. This, to a large extent, the speculative market enables them to do. In the first place, the holder of any commodity may sell it to a speculator, if he fears a coming fall in value, or a buyer can buy of a speculator for future delivery any actual commodity he needs, if he fears a rise. But the speculative market affords a better method of insurance by means of "hedging" transactions. Under this method, for every trade transaction a corresponding transaction of the opposite kind is made in the speculative market. If a man buys for trade purposes, he sells short on the exchange an equal amount, and covers this short line as soon as he disposes of his first purchase. He has made two equal and opposite transactions, and if the price moves either way he loses on one and gains on the other. In this way he makes himself largely independent of speculative fluctuations. The details of this practice may be seen from a hypothetical case given by A. C. Stevens, in the *Quarterly Journal of Economics* (Vol. II, p. 50). Though simpler than many actual transactions, it admirably illustrates the principle involved:

A New York merchant buys 100,000 bushels of No. 1 hard wheat at Duluth, and orders it shipped by vessel to Buffalo, to go thence to New York by canal. He does this not because he "wants the wheat for his own use," but as a merchant who believes that the Duluth price and the cost of getting the grain to New York, in view of known or apparent market conditions or of anticipated requirements abroad, will enable him to sell the grain in New York at a profit. With a more primitive view, he would ship his grain, wait until it arrived, look for a purchaser, and, finding one, sell the wheat at the price current at date of arrival—say three weeks after he bought it. If at a profit, well and good; but if the price had declined, he would sustain a heavy loss, owing to the size of the shipment. Thus, when the world's requirements are for larger available stocks, and the movement

[1] Adapted from "Speculation on the Stock and Produce Exchanges of the United States," *Columbia Studies in History, Economics, and Public Law*, VII, 441–44.

of grain must be in large lots, the future contract comes in to protect the handler. The New York merchant, therefore, sells 100,000 No. 2 spring, September delivery, at Chicago at the date of his Duluth purchase, in August. When the wheat reaches Buffalo the price has advanced and millers there want some No. 1 hard wheat. He sells them 25,000 bushels and buys 25,000 bushels of No. 2 spring wheat at Chicago, September delivery, to make good the original quantity purchased. By this time he has also sold at New York 100,000 bushels, September delivery, to an exporter and bought 100,000 bushels more at Chicago, relying on the 75,000 bushels on the way and his ability to get 25,000 bushels more before it is demanded, to keep his engagement. When the 75,000 bushels of No. 1 hard spring wheat reaches New York the price has declined fractionally, and the owner is enabled, in consequence, to purchase 25,000 at a slightly better price, relatively, than he had paid in Duluth, selling 25,000 bushels coincidently at Chicago for September delivery. He lost on his Duluth purchase and on the 25,000 and 100,000 bushel purchase at Chicago, and on the 25,000 bushel purchase at New York. But he made rather more than corresponding gains through his sale, spot delivery, of 25,000 bushels at Buffalo, including profits on his sales of 225,000 bushels for September delivery at Chicago and New York, so that he gains on sales of 250,000 bushels and loses on the purchases of 250,000. The transaction as a whole is not very profitable, but millers at home and abroad get wheat at the lowest market prices at dates of purchases, the grain is moved from Minnesota elevators to Buffalo and New York and the Glasgow mill, and the merchant whose sagacity, energy, and foresight led him to aid in the undertaking, even when price conditions were unfavorable, is able to protect himself from excessive loss without depressing the price to the original holder, who represents the grower, and without having as incentive (not to mention the ability) to unduly advance the price to the consumer, as represented by the miller.

The same method is adopted by the elevator men, the exporters, and the manufacturers. Millers own large stores of wheat in country and terminal elevators, which are insured by the same process. As soon as the miller buys in the country, or elsewhere, for grinding purposes, he sells an equivalent amount by telegraph on some exchange. Then when he disposes of his flour, he covers at the same moment his hedging sales by corresponding purchases. Since flour in the main fluctuates with the value of wheat, this affords nearly complete protection. The manufacturer of cotton, on the other hand, usually protects himself by purchases. Spinners do not hold such large stocks of their raw material as do the large millers, and often sell their product for delivery at home or abroad at some future time, while

not in possession of any cotton at the moment. Immediately on placing such an order, purchases of the required amount of cotton may be made on the Cotton Exchange, and as soon as the spot cotton for manufacture is secured, the long interest on the exchange is sold out. The spinner is insured by his purchases, as the miller by his sales.

This practice of hedging is now universal in the trade in grain and cotton. Not to hedge is considered the most reckless kind of business among large dealers and millers. That is, the man who keeps out of the speculative market is said to be a speculator. The spinner however, uses the "future" market much less than the dealer or miller. Dealers and exporters hedge all their purchases. Nine-tenths of the cotton shipped to Liverpool is hedged there or in New York. Probably over 90 per cent of the great wheat holdings in the elevators of Duluth and Minneapolis are sold against in this way. Some of the most prominent elevator men of Chicago claim that every bushel which they buy for storage is invariably protected by a hedging sale. It may be that the men who control the elevator companies are independently "plungers" in the market, but this has nothing to do with their regular elevator business. Some millers or elevators may also carry a small amount, as a legitimate speculation; but in the main the rule of the trade is to insure everything at all times and under all circumstances.

160. THE EFFECT OF SPECULATION IN WHEAT AND COTTON[1]

Let us review briefly the usual dealings in the speculative market and notice the effect of the operations of the two sides constantly working the market in opposite directions, the "bulls" and the "bears." Let us first follow the action of a "bear" who sells October wheat in July, hoping for a fall in prices or, as some would have it, hoping to depress prices. The immediate effect of such a future sale upon July spot prices will be practically nil, for the October wheat cannot satisfy the immediate demand for spot wheat. What effect will the sale have on prices of spot wheat in October? The "short seller" of July now appears as a buyer in order to cover his contracts, and, if his trading has any effect on the market at all, it is to increase the demand, not the supply. As far then as he can influence spot prices, i.e., prices paid to the producer, it will be in favor of higher prices and not lower. If the conditions of the market are such as to

[1] Adapted from *Report of the Industrial Commission*, VI, 189–91, 224.

result in low prices, that is, to the "short seller's" advantage, then, because they are such, he must hasten to buy up the necessary amount of wheat which he originally undertook to deliver during that month; and, by so doing, he and his fellow "bears" create an increased demand which checks the prevailing tendency to lower prices. Thus, while the short seller may at times be in a position to depress future prices by creating a fictitious oversupply, when it comes to spot prices, i.e., the only prices which are of any practical interest to the farmer, the "bear" appears as a buyer and thereby, if at all influencing prices, must raise them.

Let us look now at the "bull" side of the market. The "long" has bought a quantity of wheat in July to be delivered to him by the "short" in October. Again, as in the case of the "bear," the transaction will have no effect upon current spot prices. Even if we were to admit that the speculative purchases and sales for future delivery could effect current spot prices, the opposite effect of the transactions of the "bull" and the "bear" would balance each other. What will be the effect of the transaction on spot prices in October? The original "long" appears now as a seller in liquidating his purchases, and to that extent apparently increases his supply and forces down prices. But it is only apparently, for in reality he cannot add one grain to the actual supply on the market. The wheat he is ready to sell has just been delivered to him by the original short seller, and would have just as surely been offered for sale by the farmer if there were no short sellers and long buyers in existence. It may be urged that the same quantity of wheat which would have been sold but once by the farmer is now offered first by the farmer to the short seller, next by the short seller to the long buyer, and finally by the latter again to somebody else, thus swelling the apparent supply and tending to lower prices. But in all such cases the fictitious supply has been met by a fictitious demand, which have all been balanced long before the month for which the contract has been concluded has arrived.

The professional speculator is in the market not for the purpose of either depressing or raising prices. He is as ready to make money on a rise as on a fall in prices. In either case he would try to ascertain what the probable tendency of the market is before he embarks on any undertaking. No speculator or clique of speculators in their senses would undertake to try to depress prices in the face of a rising market. The repeated failures both of "bull" and of "bear" cliques have not only served to teach speculators a lesson and thus diminish

the number of such ventures, but are also the best proof that the "bear" is by no means the only factor in the market. Such being the case, the short seller in making his contracts—say in October, the month during which the farmer disposes of most of his produce—for future delivery a few months hence, will discount all past and future conditions that may be foreseen when fixing the price for future delivery. As a matter of fact the October price of December wheat is always higher than the October price of spot wheat; likewise the December price of May wheat is always higher than the December price of spot wheat.

The difference in speculative prices or future bids at different places must necessarily conform to the same general rule, that the difference between prices for the same article in two markets tends to equal the cost of transportation between them. The conclusion to which we are led is substantially this, that the speculative system has to consider two kinds of values in the commodities it deals with, namely, place values and time values. Place values vary by the difference, for example, between the value of a bushel of wheat at one place (Chicago) and another (Liverpool), or of a pound of cotton at one place (New Orleans) and another place (Liverpool). By time value is meant the difference between the value of a commodity (as cotton or wheat) at one time (July) and at another time (October). The difference in place value, in the long run, where surplus capital is plentiful, tends to conform to the cost of carriage between the two places, the cost of carriage including all elements of expense for distribution. Time values, on the other hand, differ according to the degree of correctness of the judgment of the speculative dealer whose business it is to foretell the factors and conditions that are likely to influence the course of future prices. Inevitably the few of best foresight into future conditions are going to make the most money. Their fortune lies in foreseeing in advance of others the point at which price-making factors are going to find their focus.

161. THE UNITED STATES COTTON FUTURES ACT[1]

SECTION 1. [Short title.]

SEC. 2. [Definitions.]

SEC. 3. That upon each contract of sale of any cotton for future delivery made at, on, or in any exchange, board of trade, or similar institution or place of business, there is hereby levied a tax in the

[1] Abridged by the editor.

nature of an excise of 2 cents for each pound of the cotton involved in any such contract.

SEC. 4. [Contract must be in writing, showing terms of contract, names and addresses of the parties, and quantity of cotton.]

SEC. 5. That no tax shall be levied under this Act on any contract of sale mentioned in section three hereof, if the contract comply with each of the following conditions:

First. Conform to the requirements of section four of, and the rules and regulations made pursuant to, this Act.

Second. Specify the basis grade for the cotton involved in the contract, which shall be one of the grades for which standards are established by the Secretary of Agriculture except grades prohibited from being delivered on a contract made under this section by the fifth subdivision of this section, the price per pound at which the cotton of such basis grade is contracted to be bought or sold, the date when the purchase or sale was made, and the month or months in which the contract is to be fulfilled or settled: *Provided*, That middling shall be deemed the basis grade incorporated into the contract if no other basis grade be specified.

Third. Provided that the cotton dealt with therein or delivered thereunder shall be of or within the grades for which standards are established by the Secretary of Agriculture.

Fourth. Provide that in case cotton of grade other than the basis grade be tendered or delivered in settlement of such contract the differences above or below the contract price which the receiver shall pay for such grades other than the basis grade shall be the actual commercial differences determined as hereinafter provided.

Fifth. [Cotton that is below the grade of Good Ordinary or, if tinged, cotton that is below Low Middling, or, if stained, cotton that is below Middling, or cotton that is less than seven-eighths of an inch in length of staple, or cotton of perished staple or of immature staple, "gin cut" or reginned, "repacked," "false packed," "mixed packed," or "water packed" shall not be delivered in settlement of such contract.]

Sixth. [Deliver full number or weight of bales called for, five days' written notice of date of delivery, written certificate of grade of each bale, identifying marks, etc.]

Seventh. [Disputes settled by Secretary of Agriculture.]

SEC. 6. That for the purpose of section five of this Act the differences above or below the contract price which the receiver shall pay

for cotton of grades above or below the basis grade in the settlement of a contract of sale for the future delivery of cotton shall be determined by the actual commercial differences in value thereof on the sixth business day prior to the day fixed for delivery of cotton on the contract, established by the sale of spot cotton in the market where the future transaction involved occurs and is consummated if such market be a bona fide spot market [otherwise, the average of five places that are spot markets, etc.].

SEC. 7. [Only those markets shall be considered bona fide spot markets which the Secretary of Agriculture shall designate.]

SEC. 8. [Secretary shall consider only such markets as handle such volume and under such conditions as to reflect accurately the value of middling cotton and the other official grades, etc.]

SEC. 9. That the Secretary of Agriculture is authorized, from time to time, to establish and promulgate standards of cotton [to be known as the "Official Cotton Standards of the United States"].

SEC. 10. That no tax shall be levied under this Act on any contract of sale mentioned in section three hereof, if the contract comply with each of the following conditions:

First. Conform to the rules and regulations made pursuant to this Act.

Second. Specify the grade, type, sample, or description of the cotton involved in the contract, the price per pound at which such cotton is contracted to be bought or sold, the date of the purchase or sale, and the time when shipment or delivery of such cotton is to be made.

Third. Provide that cotton of or within the grade or of the type, or according to the sample or description, specified in the contract shall be delivered thereunder, and that no cotton which does not conform to the type etc. shall be tendered or delivered thereunder.

Fourth. Provide that the delivery of cotton under the contract shall not be effected by means of "set-off" or "ring" settlement, but only by the actual transfer of the specified cotton mentioned in the contract.

This Act shall not be construed to impose a tax on any sale of spot cotton.

SEC. 11. That upon each order for the making of any contract of sale of cotton grown in the United States for future delivery in any exchange in any foreign country, there is hereby

levied an excise tax at the rate of 2 cents for each pound of the cotton so ordered to be bought or sold under such contract: *Provided*, That no tax shall be levied under this Act on any such order if the contract made in pursuance thereof comply either with the conditions specified in the first, second, third, fourth, fifth, and sixth subdivisions of section five, or with all the conditions specified in section ten of this Act.

[SECS. 12 to 21, inclusive, provisions for administration, penalties, etc.]

NOTE.—This act was approved August 18, 1914. Suits were shortly brought to test its validity, and the following year it was declared unconstitutional. The basis of this decision, however, was technical in character and, upon the reconvening of Congress, a new bill, similar in form and intent, was introduced. Concerning the interpretation of the old act and the changes introduced in this new bill Secretary Houston writes as follows:[1]

Section 3 of the United States Cotton Futures Act of August 18, 1914 (38 Stat., 693), imposes a tax, at the rate of 2 cents for each pound of cotton involved, on all contracts of sale of cotton for future delivery made at, on, or in any exchange, board of trade, or similar institution or place of business. Section 5 prescribes a form of future contract which may be made on any exchange, board of trade, or similar institution or place of business without liability to the tax imposed by section 3.

Section 11 of the act imposes a tax, at the rate of 2 cents for each pound of the cotton involved, on each order sent from the United States for the making of a contract of sale of cotton grown in the United States for future delivery at, on, or in any exchange, board of trade, or similar institution or place of business in a foreign country, but further provides that the order shall be exempt from such tax if the contract made in pursuance thereof comply with the conditions specified in the first six subdivisions of section 5. Thus, if any foreign exchange adopt a form of contract that complies with the conditions specified in the first six subdivisions of section 5 of the act, orders for the making of such contracts thereon may be sent from the United States without any liability to the tax imposed by the United States Cotton Futures Act.

[1] *Service and Regulatory Announcements No. 9, United States Department of Agriculture*, pp. 98–99.

Up to the present time no foreign exchange has adopted a form of future contract for cotton grown in the United States that complies with the conditions specified, an important one of which is the recognition and use of the Official Cotton Standards of the United States. During the latter part of 1914 representatives of this department were sent to Liverpool, Bremen, and Havre to explain the proposed Official Cotton Standards of the United States to the exchanges in those cities, with the view of securing their adoption as international or universal standards.

H.R. 11861 substantially incorporates the provisions of the United States Cotton Futures Act of August 18, 1914, and in addition includes two new provisos to section 11 and a new section denominated section 11A. The first of the new provisos to section 11 provides that if the Secretary of Agriculture determines and publicly announces that the terms of any future contract made on a foreign exchange are the substantial equivalent, and sufficient to accomplish the purposes, of the conditions specified in the fourth, fifth, and sixth subdivisions of section 5 of the act and the rules and regulations relating thereto, such contract shall be deemed to comply with such conditions. The obvious effect of this proviso would be to enable foreign exchanges to comply more readily with the conditions for exemption from taxation.

It appears that the future contract for American cotton now in use by the Liverpool Cotton Association likely is, or could very easily be made, the substantial equivalent and sufficient to accomplish the purposes of the fourth, fifth, and sixth subdivisions of section 5 of the act. It now complies with the first subdivision of section 5. Thus in addition, by its recognition and adoption of the Official Cotton Standards of the United States (as specified in the second and third subdivisions of section 5), the Liverpool contract could be freely traded in by persons in the United States without liability to taxation under the provisions of H.R. 11861, if enacted.

The last proviso to section 11 of the bill exempts from taxation thereunder all orders sent from the United States for future contracts on foreign exchanges, as hedges of spot cotton of American growth purchased or sold for shipment, or shipped or consigned, from the United States to a foreign country, and for the transfer and liquidation of such hedges. It is made a condition of the exemption that a report of the transaction, including the shipment of the cotton involved, be made to the Secretary of the Treasury. Thus farmers,

spinners, merchants, and all other persons in the United States could freely send orders abroad for the making of future contracts in cotton on foreign exchanges, as hedges in connection with their actual spot transactions, without any liability to taxation under the act. Furthermore, under the bill, if enacted, all orders from the United States for the making of future contracts on any foreign exchange, including those for purely speculative purposes, would be exempt from taxation thereunder if such exchange should adopt the Official Cotton Standards of the United States and substantially comply with the other conditions specified in the first to the sixth subdivisions of section 5.

Section 11A of the bill is framed so as to tax orders received from a foreign country for the making of future contracts on cotton exchanges in the United States to the same extent as orders from the United States to such foreign country for the making of future contracts on exchanges therein are taxed under the act, provided the exchanges in such foreign country do not comply with the conditions specified in section 11 for exemption from the tax of orders sent from the United States. The object of this provision apparently is to give persons in a foreign country no greater privileges of dealing in future transactions on cotton exchanges in the United States involving American-grown cotton than are afforded to persons in the United States of dealing in such transactions on exchanges in the foreign country.

NOTE.—The act as finally passed (Public Act No. 190, approved August 11, 1916) did not include the provisions of section 11A of the bill (H.R. 11861) discussed above by the Secretary of Agriculture. Nor did it contain section 11 of the old act (see pp. 508–9). Instead, section 11 of the new law provides "that the tax imposed by section three of this Act shall be paid by the seller of the cotton involved , by means of stamps which shall be affixed to such contracts." There was added also a section 6A exempting from taxation any contract which provides that if grades other than the basis grade specified in the contract shall be tendered, the parties to the contract may agree, at the time of the tender, as to the price of the grade or grades so tendered, and that if they cannot so agree the buyer may demand delivery of cotton of the basis grade at the price named in the contract.

Otherwise the provisions of the old act given above are embodied also in the new act.—EDITOR.

162. THE OFFICIAL COTTON STANDARDS OF THE UNITED STATES[1]

For several years previous to the passage of the United States Cotton Futures act, the cotton specialists of the Department of Agriculture had conducted extensive investigations and surveys throughout the cotton-growing states. These studies resulted in the collection of valuable information regarding the varying characteristics of the cotton produced throughout the cotton belt. In one season alone this work involved the collection of over 35,000 samples taken systematically at stated intervals from farmers' sales in 70 typical markets in nine cotton-growing states. These were assembled in Washington, D.C., and were carefully graded and stapled.

From the samples collected in each state a set of types was made showing each grade from middling fair to good ordinary. This collection illustrated the varying qualities produced in these states. It also demonstrated the possibility and feasibility of making a single set of standards to represent all these cottons. It was found that a box of middling cotton, containing 12 types, could include types from the Coastal Plains section of the South Atlantic States of a grayish white color with small or peppery leaf, types of a creamy color from the Piedmont section, pearly white types with larger leaf from the Gulf States, and types of a slightly reddish or dingy color from Texas or Oklahoma. Thus all parts of the cotton belt could be represented, or, in other words, one set of standards could be made representative of all these cottons. There had always been disagreement among cotton men as to the possibility of classifying the cotton from the entire belt by a single set of standards. A large number of dealers always had contended that separate standards must be prepared for Eastern or Upland, Gulf, and Texas cottons. Experience with the permissive standards which the Department of Agriculture had been preparing since 1909 under the authority of the annual appropriation acts had indicated clearly what modifications were necessary in order that a standard should represent more accurately those qualities which are produced in an average cotton crop.

The department also had in its possession copies of the proposed International Standards, of the old Liverpool standard, and of local standards from various markets in the South.

This wealth of valuable material had been accumulated in the course of the department's study of cotton grading and was available

[1] From *Service and Regulatory Announcements No. 6, United States Department of Agriculture*, pp. 2–3.

for immediate use when the United States Cotton Futures act was passed. A study of this material emphasized the fact that there was no standard for American cotton which was accepted by, or was acceptable to, the cotton trade as a whole.

Soon after the passage of the act the department secured the assistance of several expert cotton classers from the classification committees of the New York and New Orleans cotton exchanges, who collaborated with the department's specialists in working out the actual details of a comprehensive standard. The material in hand showed the possibility of a standard which would include all the essential qualities of the cotton of the various sections. In order that these qualities might always appear in the same proportions and with the same arrangement in the practical forms of the standards subsequently made, a definite system of numbering the 12 types in each box was devised. A system of recording was instituted by which each of the 12 types in any box is sure to be made of cotton from the same part of the belt and having the same grade characteristics as the corresponding type in any other box of the same grade. In this way a set of nine grade boxes was prepared,[1] which was believed to embody the essential qualities which should appear in a comprehensive standard and which would be representative of all white American cotton. These nine grades were promulgated on December 15, 1914, by the Secretary of Agriculture as the Official Cotton Standards of the United States under the provisions of the United States Cotton Futures act.

B. Auctions and Public Sales

163. AUCTION SALES OF FRUITS AND VEGETABLES[2]

By VICTOR K. McELHENY, Jr.

In the early days almost all oranges, lemons, grapes, and pineapples were imported from foreign lands. Large quantities would arrive at our eastern ports consigned to various importers; buyers

[1] Middling fair, strict good middling, good middling, strict middling, middling, strict low middling, low middling, strict good ordinary, good ordinary. Subsequently, work was undertaken toward establishing official grades for tinged and stained cotton. On January 28, 1916, five grades of Yellow Tinged Cotton, three of Yellow Stained Cotton, and three of Blue Stained Cotton were promulgated by the Secretary of Agriculture.—Editor.

[2] Adapted from a paper read before the Pan-American Scientific Congress, Washington, D.C., December 27, 1915, to January 8, 1916. (Copyright by American Fruit and Produce Auction Association.)

were divided and had to trade with various importers in various quarters. There was no uniformity or stability of price. Similar grades would bring widely divergent prices. Some brands would sell well; the same quality bearing a different brand would be sacrificed. Commodities could not be quickly distributed. Distribution was not expanding with increasing offerings. Before a cargo was cleaned up at private sale, another cargo would arrive. Neither shipper nor buyer knew what he was doing. It was not merchandising; it was speculation. Such obstacles restrain trade instead of expanding it. For the purpose of overcoming this division of the trade, of concentrating sellers and buyers in one place, of giving stability and uniformity to prices, and of securing speedy and wide distribution the auction method was adopted.

Today there are sixteen American cities in which are held regularly public auctions of fruits and in some instances vegetables. Eighty-five per cent of Florida oranges and grape fruit; 75 per cent of pineapples, oranges, and grape fruit from Porto Rico, Cuba, and Isle of Pines; 98 per cent of California oranges, lemons, cherries, peaches, apricots, pears, plums, and prunes; 100 per cent of Sicilian lemons; 100 per cent of Almeria grapes from Spain; 100 per cent of cherries, pears, and prunes from the Pacific Northwest which are sold in the large auction cities of the eastern part of the United States, are now sold at auction. In addition, the bananas that are consumed in New York and Baltimore are sold in that way. In 1914 one hundred and fifty thousand dollars worth of chestnuts from France, Spain, and Italy added to the vast volume of business going through the auction companies of New York.

The services which the auction renders are ten in number. It advertises the sale and prints a catalogue of the offerings. It divides the contents of the car or cargo into lots according to the catalogue. This "lining-up" enables the buyer to examine the goods quickly and make a notation as to its quality and condition on his catalogue as an aid to his bidding at the sale. A certain number of packages of each "line" are opened for the inspection of buyers. These are called "parts of marks" not "samples." The buyer is free to open other packages if he so desires. The commodity is sold at public auction to the highest bidder by auctioneers who are specialists in the line of goods that they sell. At each sale the auction clerk makes a record of the number of the lines sold, the price at which the goods are sold, the name of the buyer, and the quantity purchased by each buyer.

This record is open to the inspection of the seller. The auction superintends the delivery of the commodity sold to the buyer. Within twenty-four hours of the sale the auction sends an "account sales" to the seller together with a check for the amount of the sale less the commission charged by the auction house. Ninety per cent of the auction sales in the large auction markets are on credit. The auction house guarantees the seller against loss arising from the insolvency of the buyers. The auction house after the sale furnishes the seller with an exact copy of the catalogue used on the sale with the prices realized opposite each line sold. (See catalogue, p. 516.)

In most of the markets where auctions are established the auction house does not accept direct consignments. Auction offerings come through the salaried representatives of co-operative associations, the salaried agents of shipping concerns which assemble growers' shipments into carload lots or through private agents of growers, which latter are termed "receivers" and who work on a commission basis. These receivers usually handle only commodities sold through the auction. Other offerings come through "commission men" who sell at auction commodities customarily thus sold, while selling their other commodities at private sale.

There are present at the auction sales jobbers, fine fruiterers, wholesale grocers, representatives of chain stores, brokers for hotels, restaurants, and retail stores, push-cart men, and peddlers. There are buyers for all grades of fruit from the very finest to the most inferior. There are buyers for fruit in prime condition and buyers for ripe fruit that must go into immediate consumption. There are large buyers and small buyers. (See chart, p. 517.)

The larger the quantity of a commodity the greater the necessity for complete publicity on distribution. Auction gives that publicity. Auctions are public sales in every sense of the word. The auction houses can have no secrets. Any questions that may be asked of them by a shipper can be answered and will be answered.

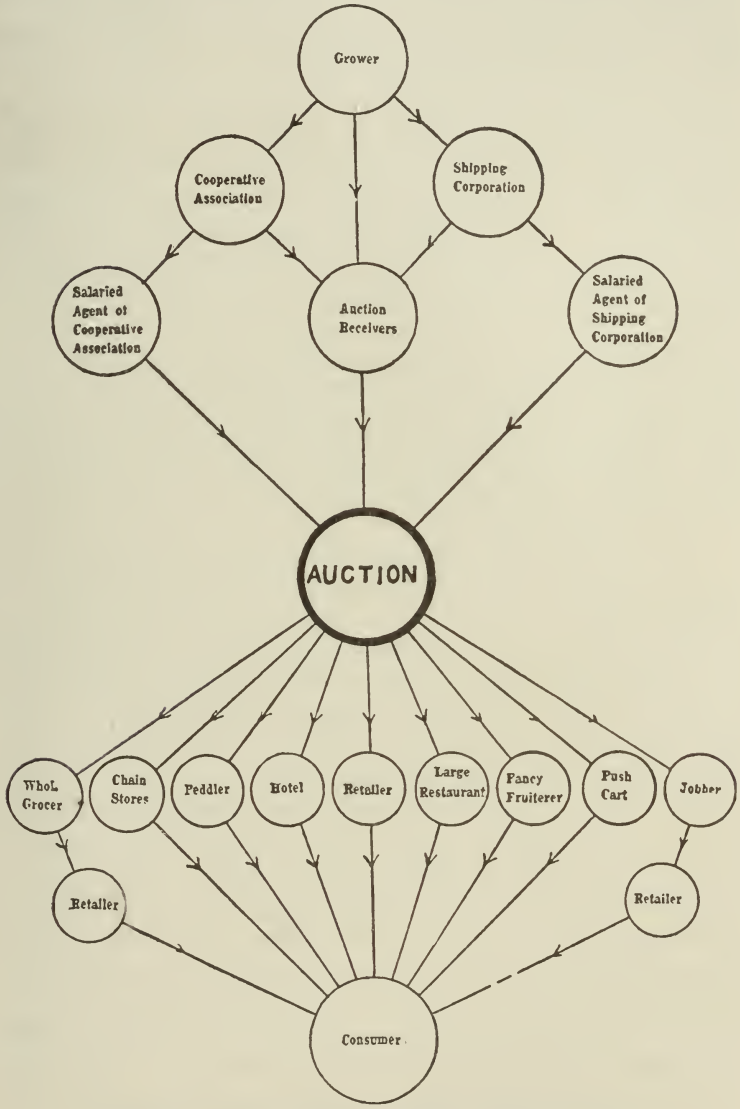
Not less important than complete publicity is competitive bidding; in fact it might be said that the keystone of the auction system is the selling of the commodity to the buyer who will bid the most after open competitive bidding. The experienced auctioneer knows the buyers, knows what buyers are dealing in the same lines of fruit, and the inevitable result is that competitive bidding brings to the grower results that cannot otherwise be obtained.

No system of selling can handle the vast quantity of goods that the auction sells with as few salesmen. The auctioneers are the salesmen. They must be efficient. It takes years to make a successful

LINES	MARKS	DESCRIPTION		
		PORTO RICO FRUIT EXCHANGE SS. BRAZOS FANCY PORTO RICO GRAPE FRUIT		
	Fancy			
1387	36	2	BOXES	$4 00
1388	46	11		5 87½
1389	54	72		5 00
1390	64	90		5 00
1391	80	91		5 00
1392	96	29		4 50
1393	112	4		3 62½
1394	126	19		3·25
				
	Fancy			
1395	46	2		3 37½
1396	34-46-1 100-1	2		2 50
	Brights			
1397	46-2 54-7	9		3 37½
1398	64-17 80-2	19		3 75
1399	100-7 126-1	8		3 12½

auctioneer in these lines. The auctioneer must know and be a specialist in the fruit or produce business. His duties require him just previous to the sale to examine the commodity that he is to sell as to quality and condition and make a notation on his catalogue so

he can secure the highest price for the different grades of fruit. He also must know the quality and condition of the commodity sold by



POSITION OF AUCTION IN CHANNEL OF DISTRIBUTION

his competitor. The auctioneer pays a license fee and is under bond to the municipality.

There are few points connected with the marketing of fruit and produce that equal in importance the matter of expense. It is therefore well to remember that the auction system of selling enables the grower to get prompt returns from the auction companies at a lower selling expense than by any other system.

The auction can relieve a glutted market as no other medium can. Just as soon as the market sags, the representatives of the peddlers and the push-cart men at the auction buy heavily. With all the push-carts and peddlers' wagons featuring a commodity, many not handling anything else for the time being, vast quantities of fruit can be disposed of in case of a glut. The result is that consumption is greatly increased. The glut relieved, prices rebound and the market becomes normal.

The public sales system has a particular advantage over private selling in that, the glut having been relieved, the stimulated rate of consumption sends prices upward at once. It is quickly apparent that a number of buyers want a certain kind of fruit. No buyer can hide the fact. He must bid briskly and bid high if he is to get the fruit that his customers want.

There are too many racial differences and too many varying interests involved to enable the buyers to form a combine in the auction market. There are Greeks, Hebrews, Irishmen, Germans, Italians, and Americans, both large and small buyers, at every public sale. The auction companies have made combinations impossible by forbidding one buyer to bid for any other who is present at the sales. Buyers who cannot be present at a sale are represented by brokers whose business it is to buy at auction sales.

The volume of certain lines of the fruit and vegetable industry has grown to such proportions that it has become absolutely necessary for the grower to adopt the auction system of selling. There is a point at which the system of private selling breaks down simply because the machinery of the system is not adequate. That point is reached where the distribution has not sufficiently kept up with the production. When the production of a particular commodity is large, in order to secure the best results for the grower, there must be a concentration at one place of both the commodity and the buyer, a minimum number of movements, minimum expense, and speed in delivery. When there is such concentration and the commodity is standardized, there is no question but that the auction system is the most efficient method of disposing of the product.

164. MARKETING AT THE STOCKYARDS[1]

By K. F. WARNER

To whichever market live stock is consigned, the marketing system that handles them upon arrival is practically the same. There is a stockyards company at each market which is an independent organization, and which provides pens and other facilities near the packing houses where animals are received and cared for until sold. While under different managements and ownerships, the yards of one market are almost identical with those of another and practically the same system of selling is followed in all of them.

Although a packer may control the stockyards company through stock ownership, as at South St. Paul, it should be emphasized again that the latter is always a separate company with its own organization and officials. It owns the pens, yards, and equipment of the yards proper; it receives and reships the stock; provides a supply of feed and water; and weighs all animals for both buyer and seller. The commission firms are composed of men whose business it is to sell or buy for their patrons; they act principally as experienced salesmen, whose training and experience make them better able to transact business in the yards than the strangers who ship in the stock.

A load of cattle arrives on the Monday market, which is usually the strongest and largest. When hauled to the unloading platform, the stockyards company receives, unloads, counts, and yards it in the pens assigned to the consignees. Stock is not consigned to individuals but to commission firms operating in the yards. The pens are owned by the company and allotted to the commission firms, but rent is charged to the shipper as a per head yardage fee. Upon receiving the load, the commission man sorts it to the best advantage for selling, and supervises the feeding and watering until sold.

All animals that pass through the stockyards market are sold according to the classes and grades to which they belong. The classification is based on the use to which the animals will be put, this being determined chiefly by their sex, age, weight, form, quality, and condition. The grades within the classes run from prime and choice to inferior, and represent the different degrees of excellence in quality condition or fleshings, and form. The classifications are comparatively

[1] Adapted from "The Marketing of Live-Stock Products in Minnesota," *University of Minnesota Studies in the Social Sciences*, No. 4, pp. 17-21. (Copyright by the University of Minnesota.)

uniform at the various live-stock markets and similar grades with some local variations are used as the basis of published quotations at leading market centers.

Cattle are divided into seven general classes, the first five of which consist of animals which are ready for slaughter. The first one is called "beef cattle" and includes only steers that are fattened, and may be sold as carcass "beef." "Butcher stock" consists of the inferior steers and all the cows and heifers except the very poorest. These latter are called "cutters," "strippers," and "canners," and are the old, thin animals which are fit for little but boneless cuts, canned and cured meats, and sausage. The fourth class, which is made up of "bulls," is used mainly for sausage, though the younger and better ones are often sold as dressed beef or beef cuts, in which case they are classed as butcher stock. Calves constitute the fifth division. The last two classes are called "stockers" and "feeders" and include thin cattle, both male and female, which are sold to feeders for further fattening. The "stockers" are younger and generally weigh under seven hundred pounds, while the "feeders" are older and heavier.

Prices paid and quoted on these classes are based chiefly upon the killing value of the animal. Thus, "canners" sell below "beef cattle" because they will dress out a small proportion of valuable meat; and stockers are worth less than feeders because they require more time and feed to put them in condition for slaughter. Sheep and swine are graded upon the same general principles as cattle, although, in the case of hogs, at least, with less detail.

The buyers consist of five classes: the local packer who is buying for immediate slaughter; the buyer of a packing company who has no plant at that particular market; "order buyers," or those who are buying on orders from outside parties; the speculator or "scalper" who picks up bargains to resell; and, lastly, the stockman who comes to buy feeders. The buyers of the local packers and the feeder-buyers are the ones that really constitute the backbone of a market. The representatives of the outside packer, the order buyers, and the scalpers are the ones who prevent violent fluctuations in prices and who tend to establish and hold the normal spread between different markets. If South St. Paul values decline more than those of Chicago, some scalper or packer's representative bids in to hold until prices rise or for shipment east, and these purchases strengthen the market. Thus, though Swift & Company have the only large plant in South St. Paul, they must bid in competition with other buyers who pur-

chase for shipment to other markets. In Chicago one other class of order buyers makes a strong demand for good, heavy cattle. Orthodox Jews are not supposed to eat beef that has been killed over three days, and as a result many "Kosher" cattle, as they are called, are bought for shipment to New York on foot, this demand tending to keep up the price.

With these possible purchasers before him, the commission man plans how best to sort the cattle, and dickers with prospective customers, holding out for as much as he thinks he can get. Finally, a buyer rides into the pen and looks the stock over. "I'll give $7.90" (per hundredweight). "They're worth $8.15 today," the commission man replies. The buyer shakes his head and starts to leave. "Eight even," he calls back. "Eight and a nickel," the commission man concedes. "Weigh 'em," from the buyer, and the deal is over. No binding memorandum is made of the trade until night, when each sale is registered, together with price, name of firms, and weights. After the deal is closed, the cattle are run over the scales and weighed by the stockyards company. By means of a patent device, a cardboard slip is inserted in the scale and into it is impressed the weight of the load. Such recorded weights are accurate and official.

With weight and selling price at hand, the commission firm makes out the check due the shipper on his load. Although the packers pay cash to the commission firms, the latter often mail checks to country shippers before they actually receive their pay from the packers. Fixed charges are assessed against each head of stock sold in the yards and consist of a commission, a fee for yardage, and one for feed. These, together with freight, terminal charge, insurance, and inspection in case of hogs, are deducted by the commission men from the selling price of the stock before the check is remitted to the shipper, or deposited to the shipper's account, as the case may be.

Yardage fees are 25 cents per steer, or nearly 2.5 cents per hundred; hogs, 8 cents per head, or 3.5 cents per hundred; and sheep, 5 cents per head or about 6 cents per hundred. Feed costs from 2 to 3 cents per hundred pounds live weight. Commission fees for selling are $10.00 per 22,000 pound car of cattle, or 4.5 cents per hundred; hogs, $8.00 per 17,000 pound car, or 4.7 cents per hundred; and sheep, $8.00 per 12,000 pound car, or 6.7 cents per hundred.

Many loads come in and are sold by the firms to which they are consigned without the owner's being in or near the yards. Also many orders for feeders are filled by the commission men without the buyer's

ever seeing the animals until unloaded on arrival. Considering, also, that the checks are made out and the charges deducted by the commission men themselves, it would appear that there is a good opportunity for fraud. In the first place, however, a firm will not get trade unless it has a good reputation, and since there is keen competition for shipments among commission men, there is every inducement to be square and to show as good results as possible. Second, the firms are combined into an exchange with fixed rules to govern trading, and these rules are strictly enforced. Any man can get a chance to do business in the yards, but unless his reputation is good he will not be admitted to the exchange, and the buyers can readily regulate their bids so as to prevent him from getting any business. To safeguard the shipper further, a $20,000 bond is given by each firm to the exchange. With all these precautions, with the keen competition between firms, and with the speculators ready to steady the market, the shipper can be sure that these experienced men are able to procure more for his stock than he can get himself. Moreover, those who deal often in the yards consider the commission men as their friends and advisers, and in many instances the commission men advance money to them for buying feeders.

165. SELLING CHEESE ON THE DAIRY BOARD[1]

By H. C. TAYLOR[2]

Eight dairy boards were in operation in Wisconsin in 1912. They were located at Plymouth, Sheboygan, Appleton, Seymour, Lone Rock, Muscoda, Highland, and Mineral Point. The movement began in 1873, and by 1890 there were eighteen such boards in operation. There was some falling off in the years following, but in 1898 a return to the same high figure. In the next year it dropped to thirteen, which was the average of the succeeding decade, but since 1908 there has been still further decline.

The board meeting is usually held in a room temporarily set apart for that purpose in a hotel or some other building, where a blackboard is provided and where there is room for the sellers and buyers to sit in front of the blackboard. Offerings of cheese are posted on this

[1] Adapted from *Bulletin 231, Wisconsin Agricultural Experiment Station*, pp. 10–14.

[2] W. A. Schoenfeld and G. S. Wehrwein, joint authors.

blackboard and bids are also written down as they are received. This "call board" is intended to bring open competition on the cheese market, and its use became general between 1896 and 1900. Unfortunately, less than 10 per cent of the cheese is sold on the boards, and that is in a large measure bid off by the men who have contracts for much larger quantities of cheese which they are to receive at board prices. It is commonly believed that the dealer who knows that every $\frac{1}{8}$ of a cent he bids up on the cheese on the board will increase the price on all his contracted cheese by the same amount lacks the courage which a true competitive bidder should show. It has been alleged that the dealers sometimes get together before the board meetings and have an understanding as to what bids are to be made and as to who shall have the cheese. In answer to this allegation the dealers say that the independent brokers who have to depend upon the board as a place to buy their cheese will often bid up the price so that no such combination could be effective in controlling the price. Investigation tends to confirm the belief that at times the board is under the control of the dealers and again at other times the bidding becomes highly competitive.

The great bulk of cheese is sold on the basis of board prices without being offered on the board. This is less trouble to the salesman but destroys, in a great measure, the value of the "call board" as an open market. There is evidence to show that the dishonest practice of paying the salesman a tip has been indulged in for the purpose of keeping him off the board. If all the sales were made in the open market provided by properly regulated call boards, much of the occasion for suspicion of dishonesty would be removed.

During the summer of 1912 there developed in Sheboygan County a widespread dissatisfaction against the prevailing methods of selling cheese. It was charged that prices on the Plymouth Cheese Board were not really competitive but arbitrarily fixed beforehand and that there was a mere pretense of competition while the board was in session. Accordingly the Sheboygan County Cheese-Producers' Federation was formed to undertake the selling of the members' product independently of the Plymouth board. This selling organization embraced 48 factories, with a joint output of six to eight million pounds—about half the product of the county. There were difficulties at the start, but within two months the federation was selling a million pounds of cheese a month at somewhat above Plymouth board figures.

Furthermore, it is the belief of the farmers concerned in this movement that the board price has been somewhat higher during 1914 on account of the activities of the federation.[1]

C. Private Dealers and the Middleman Question

166. VARIOUS TYPES OF WHOLESALE TRADERS[2]

By J. H. COLLINS[3]

In this discussion rather arbitrary lines are laid down as boundaries for the activities of various types of middlemen, yet in actual practice these activities so overlap and encroach upon each other that resulting market practices are exceedingly complicated. One man or one firm may combine the functions of several middlemen. Many distributors act simultaneously as car-lot wholesalers, commission men, and jobbers. As a matter of fact, few firms confine their activities to one line of business. Thus, of the goods sold by a firm on one day, part may have been purchased outright in car lots, part purchased in small lots from other receivers, and part consigned on commission. While one firm may act in the triple capacity of car-lot wholesaler, commission man, and jobber, the three lines of business thus carried on at the same time are very distinct and for purposes of discussion may be considered as being performed by three separate firms.

We will begin with the broker who handles car lots only, as a rule, and who draws his business from co-operative associations, country speculators, large operators, private exchanges, and in some cases private shippers. According to strict interpretation, the term "broker" can be applied only to those middlemen who act as intermediaries between the principals in contemplated transactions and have nothing further to do with the contract itself. The broker normally does not have possession of the articles he deals in, but must carry on all business in the name of his principal. Commodities handled by brokers, as a rule, are sold to car-lot wholesalers or jobbers.

At the beginning of each business day the broker looks over his business, ascertains conditions on other markets, and takes note of the number of cars he has on hand, number en route, etc. With all

[1] This paragraph is from a later bulletin (*No. 251*) by B. H. Hibbard and Asher Hobson, pp. 24–26.

[2] Adapted from "Methods of Wholesale Distribution of Fruits and Vegetables on Large Markets," *Bulletin 267, United States Department of Agriculture*, pp. 10–22.

[3] J. W. Fisher, Jr., and Wells A. Sherman, collaborators.

this well in mind, he is ready to approach the wholesale trade. His next step is to make a careful canvass of the wholesale district, visiting or calling up by telephone all those who may be interested in what he has to offer. When a possible customer is found, the next step, in case the car or cars have arrived, is to allow the prospective buyer to inspect the contents. After inspection, satisfactory terms are arranged and then before the sale can be consummated it is necessary that the shipper confirm the broker's action. Assuming that the broker is selling a car of apples, Ganos and Grimes for instance, he may telegraph the shipper as follows:

Jones offers on car MC sixteen eight fifty-four, two fifty Ganos, two seventy-five Grimes, delivered.

In case this offer is satisfactory, the shipper's reply may read:

Confirm car MC sixteen eight fifty-four Jones two fifty Ganos, two seventy-five Grimes, delivered.

Or in case the price is unsatisfactory, the shipper might refuse as follows:

Jones too low; car MC sixteen eight fifty-four; must have three Grimes.

Collection is often made through a bank located at destination. The shipper sends the bill of lading with draft attached, to a bank, at the time the car is shipped, and after inspection the purchaser pays the draft and secures the bill of lading.

Sometimes the broker does not make a direct sale, but handles the goods through auction. His activities are then confined to seeing that the goods arrive at the auction and attending the sale to withdraw the shipment if prices are unsatisfactory.

The broker handles business in large volume at perhaps less cost to himself than any other type of middleman. He has but little capital in his business and his heaviest items of expense are usually rent, clerical help, and telegraph charges. As a rule, most of the broker's business is composed of the accounts of associations and large private shippers. The broker acts as the exclusive agent on his market for each concern that he represents, and since he handles car lots only and moves large quantities in relatively short periods of time, he is enabled to render important services at a very low cost to the shipper.

A very important factor in market distribution is the car-lot wholesaler. These men purchase fruits and vegetables from

co-operative associations, country merchants, car-lot assemblers, traveling buyers, buying brokers, individual growers, speculators, and city brokers. They distribute goods to the jobbing and retail trade or to the country trade. Thus it will be seen that their activities cover a wider field than do those of almost any other type of distributor.

Most of the city sales are for cash or for only one or two weeks' time, but country customers are often allowed thirty to sixty days in which to settle. As a rule, these sales to the country trade are the most uniformly profitable of any to the car-lot wholesaler. Prices charged are usually slightly higher than can be secured from resident buyers on the market. This, of course, is justified, as extra packing and cartage charges are involved. The country trade, as a rule, makes little attempt to keep in close touch with market prices, but prefers to place orders regularly with selected wholesalers or jobbers and depend upon receiving fair treatment. Some wholesalers do not rely simply on such orders as they may receive by mail or telegraph from country customers, but seek to develop their trade through private traveling salesmen.

Many car-lot wholesalers buy when prices are cheap and put the produce in storage, distributing later when prices admit of a fair profit. This involves a certain element of risk as a market may not take on a better tone in time for the wholesaler to move his stored goods to advantage. Profits to the car-lot wholesaler vary greatly. Since he deals very largely in perishables in large quantities and on his own account, his aim is to make as much profit as possible on each sale. He has better chances to make wide margins than has the jobber, because in many instances he deals directly with the farmer, who is an inexperienced seller and unfamiliar with market methods. However, the car-lot wholesaler buys in large quantities for future sale and thus takes greater risks than the jobber, who buys in small quantities from day to day, moves goods rapidly, and in cases of sharp market declines is able to close out very quickly. Average net profits at this stage of distribution are usually less than is popularly supposed. Business competition is usually very keen and prevents any long-continued, excessive margin or profit. Considering his cost of doing business and the services which he renders, the car-lot wholesaler probably operates on as small a margin of profit as any middleman concerned in food distribution.

These men perform the absolutely essential functions of acting as primary distributors of produce arriving at market in car lots. Any reforms which may be accomplished in distributive methods must take into consideration the fact that some definite agency must undertake the work of breaking car lots and starting distribution at market centers.

The commission merchant is a special agent whose business is the selling of goods on commission. He has possession of the commodities, and all transactions are in his own name. He may dictate terms and methods of sale, but must obey instructions if given, and he is responsible to the shipper only for a proper accounting in the final terms.

Commission men solicit shipments from growers, car-lot assemblers, and co-operative associations. It should be stated, however, that co-operative associations do not favor the promiscuous consignment of their products and seek to eliminate this method as far as possible. Commission merchants handle goods for 5 to 10 per cent of the gross selling price. In many cases, however, the dealer, by sharp practices, increases his margin to 15 per cent or over. As soon as the shipment is "closed out" the commission man deducts freight and other expenses and his charges and remits the balance to the shipper, together with an "account sales."

One charge made against dealers of this type is that they sometimes remit more than the market price to a new shipper in order to get future business. As this does not give the shipper a fair idea of the market and does give him a false impression of the dealer's ability as a salesman, it is a practice which should be regarded with great disfavor by all interests in the market. Another malpractice sometimes attributed to commission merchants is selling for more than the market price and remitting to the shipper on the basis of the market price. Many have regarded this practice as legitimate, because the increased selling price is not due to the superior quality of the goods sold but to the dealer's excellent salesmanship. These practices certainly are not common to most commission men and are not universal, as is generally supposed. Much that the shipper considers dishonest can be explained, his suspicions being due to misunderstanding, or the trouble may be traceable to the shipper himself.

It is not because commission men as a class have proven to be dishonest, but the very fact that the commission man has great opportunities for dishonesty, if he chooses to avail himself of them, has

caused shippers to condemn unhesitatingly any practices which did not appear to be perfectly plain. A shipper is seldom able to inspect his own output with an unprejudiced eye; his own product usually appears better to him than does his neighbor's offering. Often, therefore, the shipper who considers his goods on a par with the best market offerings is disappointed when returns are below the figures listed on current wholesale quotations, and accuses the dealer of dishonesty. Often, too, perishables which leave the point of origin in first-class shape arrive at destination in a greatly deteriorated condition. The grower, who last saw his produce in first-class marketable condition, does not understand or appreciate the conditions which were responsible for his loss.

Commission men offer almost the only good outlet for unstandardized goods which cannot be sold direct to the wholesale trade. Acting as primary receiver of less than car-lot shipments, they serve as a medium through which to market all goods which cannot be sold direct to car-lot wholesalers, and, when honest and efficient, they offer to inexperienced shippers the valuable services of trained experts in disposing of their produce.

Next in importance to car-lot wholesalers on large markets is the jobbing trade. Jobbers are middlemen at distributing centers who usually buy in less-than-car-lot quantities from car-lot wholesalers or commission men and in turn sell to the retail trade; in other words they are intermediaries between primary receivers and retailers. The term as here used must be distinguished from the term "jobber" as used in connection with wholesale distribution for manufacturing concerns, where the jobber distributes the total output of several factories direct to large wholesale houses.

Jobbers in fruits and vegetables get their supplies from commission merchants, car-lot wholesalers, auctions, and public markets. The chief outlet for the jobber is the retailer. The jobber, acting as the intermediary between the car-lot wholesaler and the retailer, buys in less than car lots, as a rule, makes quick sales, operates on a relatively small margin, and secures his profits by rapidly turning over his capital.

The jobber's chief usefulness at the present time is in facilitating the rapid distribution of extremely perishable products. A car of strawberries, for instance, will usually be disposed of much more rapidly when handled by several jobbers than would be the case if a single car-lot wholesaler attempted to complete the distribution to

the retail trade. With the growth of standardization, better grading and packing, together with greater efficiency in the business of car-lot receivers, it is possible that many of the present functions of the jobber may be assumed by the car-lot wholesaler. This applies to

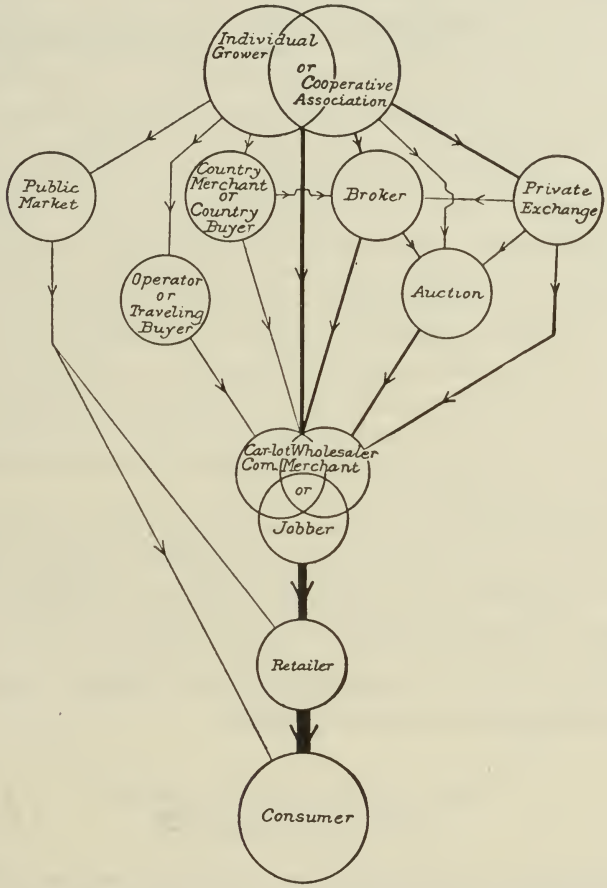


FIG. 1.—Main channels of distribution for fruits and vegetables.

our smaller markets especially. On the great terminal markets, however, the jobbers must remain important factors for some time to come. In these cities they sell to the vast number of those retailers who buy in small quantities and who cannot take time or trouble to go to primary markets and select their goods.

If the entire retail trade were to attempt to get in direct touch with car-lot wholesalers on our large markets, the congestion of business would be so great as to block most seriously the economical movement of perishable food products.

Perhaps a graphic representation of the more common steps in distribution will serve to make this subject more clear. In Fig. 1 the interlocking circles are intended to show the intimate relation between certain of the agencies interested in distribution. Thus the grower may operate individually or he may combine with his neighbors. One firm often performs the function of the car-lot wholesaler, commission merchant, and jobber, and the business details overlap in such a way that it is difficult to dissociate the three lines of business. Perishables do not and cannot pass through the hands of all the distributing agencies which are indicated. As a matter of fact, usually only a few agencies are instrumental in handling the contents of any given car. The contents of two cars coming to a large market on the same day may pass into consumption through very different channels. Thus one car may be consigned to a commission merchant, who divides the car among a large number of jobbers and retailers, while the other car may be purchased by a buyer for a car-lot wholesaler who sells to the jobbing and retail trade.

There are usually very definite reasons why goods coming to market pass on to consumption through such diverse channels. Among those factors which decide along what course and through what hands perishables shall pass in going from producer to consumer are: (1) the condition or tone of the market; (2) grade, pack, and quality of the shipment; (3) district in which the shipment originates; and (4) the shipper's knowledge of market conditions.

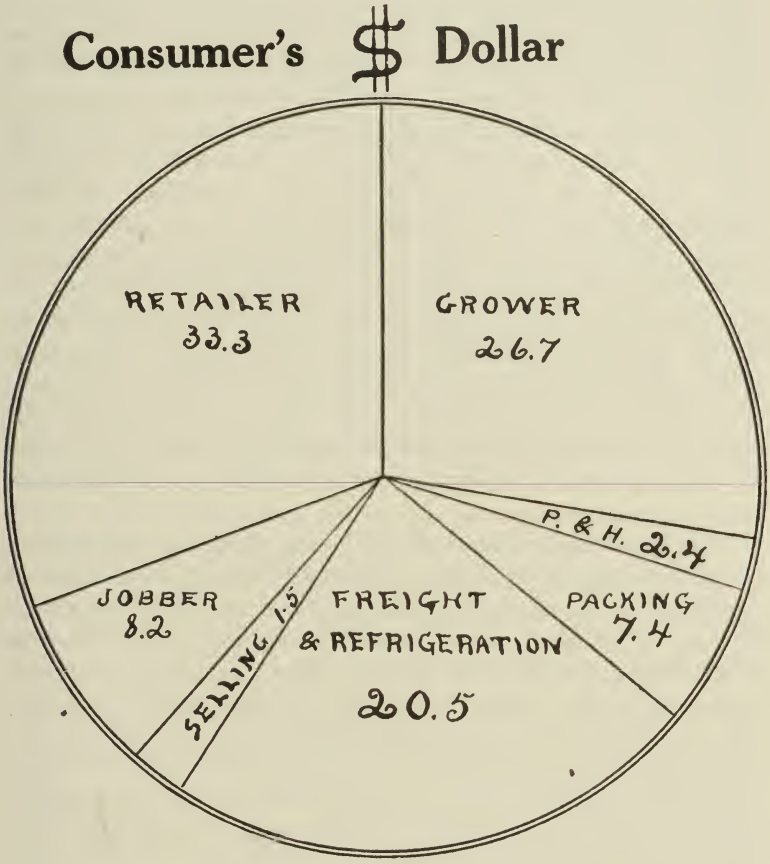
167. THE RETAILER'S PART[1]

By G. HAROLD POWELL

Taking the 30 representative citrus fruit markets, including 5,485 reports extending over the year 1914, the distribution of the consumer's dollar is as follows: 36.5 per cent of the consumer's dollar is returned to the grower in California, of which 9.8 per cent represents the proportion allotted to picking, hauling, and packing;

[1] Adapted from an address delivered at the Eleventh Annual Meeting of the Western Fruit Jobbers' Association and printed in the *Western Fruit Jobber*, April, 1915, pp. 23–31.

20.5 per cent represents the allotment to transportation; 1.5 per cent the grower's cost of selling the jobber, and 41.5 per cent the proportion represented by the jobbing and retail gross distributing costs, the latter representing four times as much as the former.



This investigation brings out clearly that the most important factor in the cost of distribution, next to the cost of transportation, is the retail distribution, which represents one-third of the consumer's dollar. The amount of the consumer's dollar represented by the gross retail cost is four times the amount represented by the jobber's cost. It is more than the proportion absorbed by the cost of transportation and the jobber's cost combined. It is nearly equal to the amount returned for the fruit on the tree, which includes the cost of

production and the grower's profit, and the cost of picking, hauling, and packing.

There are several classes of retailers engaged in the fruit business; the fancy fruit store, the high-class grocery store, the average grocery store, the chain store, the fruit stand, and the fruit vender. The present retail system is largely the result of the demands of the consumers which each class serves. A retailer's overhead charge includes store rents, salaries and wages of employees, interest on capital, cost of purchasing, re-sorting, displaying, storage, and delivering goods, taking of orders, telephone, light, heat, and other store expenses, losses from decay and deterioration, taxes, insurance, and other necessary expenses. Most of the expenses are also included in the jobber's overhead costs. Where the fruit is sold from pushcarts and street stands, some of the expenses are eliminated or are reduced. In the fancy fruit stores and in the large grocery stores which cater to the well-to-do, these overhead charges are naturally larger. They make up the cost of the service which the consumer demands, and the cost of the fruit is only one of the factors in the consumer's price. The simpler the service, the less the overhead cost, and, in those cases, the consumer pays primarily for the fruit with only a comparatively small overhead charge added for service and profit.

The retail distributing business is a vital link in the chain between the producer and the consumer. The desire for fruit is awakened by suggestion, by seeing attractive displays of fresh, luscious fruit in the windows of the store, on the counters, or in other forms of display. It is stimulated by the attractive fruit stands and by the pushcarts laden with golden oranges, by advertising in the magazines, the newspapers, street cars, and other advertising mediums. It is promoted by prices which bring the fruit within the reach of the average consumer. The retail dealer, more than any other factor, creates this appetite appeal, because he comes in direct contact with the consumer, and he stimulates or retards it by charging reasonable or exorbitant prices.

The retail dealer must therefore know how to make artistic fruit displays if he is to catch and sustain the interest of the consumer. The fruit must always be fresh in appearance, free from decay and appetizing in every way, and the price must be reasonable. If the appeal to the consumer's appetite is not strong and continuous, the retailer does not increase the consumption. If the price is not reasonable, it cannot be purchased by the average consumer. If the sales are not rapid, the fruit wilts, loses color, decays, and is a drag on the

hands of the retailer. Under these conditions the retailer, unless he is a fruit specialist, does nothing to encourage sales. The unattractive fruit is destroying the desire on the part of the consumer, the losses from bad condition are excessive, and the retailer must add a margin large enough to cover these losses and risks. Attractive displays and quick sales, at a reasonable margin of profit on each transaction, increase the per capita consumption and make a satisfactory profit for the dealer at the end of the year. Any other system jeopardizes the interest of the producer, reduces the volume of business of the jobber, and keeps the net profit of the retailer below what it otherwsie might have been.

The retail fruit business needs the same careful investigation as that suggested for the fruit jobber, with a view to improving the entire retail business system, to developing better methods of creating an increased consumption, and of putting the entire retail system on a basis which will make it the most vital factor in handling the rapidly increasing fruit crop. To accomplish this end, the average retail fruit dealer needs the co-operation of the producer and the jobber. The consumer demands a service that imposes a heavy overhead charge on the retailer's operations—a condition which the producer does not usually appreciate.

Whether the jobbing and retail fruit business is organized along economical and efficient lines, whether the purchasing, the deliveries, the credits, and other features of the business are handled with the fewest number of steps and with a minimum of economic waste, and whether the handling of the business by the producer, jobber, and retailer serves the best interest of the consumer, the author is not prepared to say. It is recognized that both the wholesale and retail systems are products of modern industrial and social life and that changes in the system must progress slowly. The facts outlined in this discussion are not presented in a spirit of criticism, but in the hope that they may lead to investigation and to a clearer understanding of the different phases of distribution, that they may induce the jobbing and retail fruit interests, the railroads, and the producer to study his own problem more carefully, and to study problems of every other factor as well, to the end that the fruit-distributing system from the producer to the consumer may be made more stable, more direct, more efficient, with every wasteful step and process eliminated, and all handled to gain the confidence of the consumer and to serve his best interests.

168. "SWAT THE MIDDLEMAN"[1]

Owing largely to the unorganized state of the producer and the consumer and the lack of adequate marketing facilities, there have grown up in cities classes of men who have taken upon themselves the burden of food distribution. There are at present altogether too many men and too much machinery involved to conduct this distribution economically. This is most marked in the elimination of the more expensive middlemen in certain classes of agricultural products.[2] In the handling of such commodities as fruits, vegetables, and similar articles of a perishable nature, the disposition to discard the more expensive methods of distribution has been very feeble.

The attitude of the producer toward commission men is one of suspicion. Where the producer does not openly charge dishonesty, he greatly doubts their business efficiency. It is difficult to see how the commission man can be eliminated unless a representative of the producer, or the railway, or the consumer takes his place. It should be said that the frequent criticism of commission men does not belong to all of them. They are made necessary by a very burdensome system of distribution and it is the greed or dishonesty of some of them that gives occasion for the criticism of the whole body of commission men.

Owing to the dissatisfaction felt by the producer toward the commission man, and definite economic reasons, the commission man is being slowly supplanted by the jobber. The jobber is interested in buying for cash for as little as he can and selling for all that he can obtain. During a period of uniform or rising prices he buys outright, whereas during conditions of oversupply, leading to fall in prices, he accepts shipments only on a commission basis in order to minimize his risks.

In order to obviate the danger of control of the supply by middlemen, means should be found and facilities afforded for a direct method of shipment from the producer to the consumer. The Massachusetts Commission on the Cost of Living aptly says: "A long line of commission men, produce merchants, jobbers, hucksters, retailers and what not simply passing goods from hand to hand like a bucket brigade at a fire, is not only inefficient and wasteful, but very costly. In these days a hydrant and a line of hose are wanted."

[1] Adapted from *Preliminary Report of the Chicago Municipal Markets Commission*, April, 1914, pp. 21–22.

[2] See *Report of the Industrial Commission*, Vol. VI, pp. 6–7.

The commission business is moribund and should have been discarded long ago. It has disappeared in some instances to the satisfaction of those affected. The consumer pays the cost of uneconomical handling of food by the commission merchants, and the elimination of unnecessary factors and the obtaining of more direct avenues to a source of supply are his sole relief. In order to economize the cost of the present distributive system he must merge the various discordant elements to secure greater efficiency.

169. THE SEEN AND THE UNSEEN[1]

By FREDERICK BASTIAT

There are several modern sects which violently oppose what they call intermediates. They would gladly suppress the capitalist, the banker, the speculator, the projector, the merchant, and the trader, accusing them of interposing between production and consumption, to extort from both, without giving either anything in return. Or rather, they would transfer to the state the work which they accomplish, for this work cannot be suppressed.

The sophism of the Socialists on this point consists in showing to the public what it pays to the intermediates in exchange for their services, and concealing from the public what it would be necessary to pay to the state for doing the same thing. Here is the usual conflict between what is before our eyes and what is perceptible to the mind only; between *what is seen* and *what is not seen.*

It was at the time of the scarcity in France, in 1847, that the French Socialists attempted and succeeded in popularizing their erroneous theories. They knew very well that the most absurd notions have always a chance with people who are suffering. Therefore, by the help of the fine words, "trafficking in men by men, speculation on hunger, monopoly," they began to deprecate commerce, and to cast a doubt over its benefits. "What can be the use," they say, "of leaving to the merchants the care of importing food from the United States and the Crimea? Why do not the state, the departments, and the towns, organize a service for provisions and a magazine for stores? They would sell at a *return price,* and the people, poor things, would be exempted from the tribute which they pay to free, that is, to egotistical, individual, and lawless commerce."

The tribute paid by the people to commerce is *that which is seen.* The tribute which the people would pay to the state, or to its agents,

[1] *Essays on Political Economy,* pp. 100–109. (G. P. Putnam's Sons.)

in the Socialist system, is *what is not seen.* In what does this pretended tribute which the people pay to commerce consist? In this: that two men render each other a mutual service, in all freedom, and under the pressure of competition and reduced prices.

When the hungry stomach is at Paris, and grain which can satisfy it is at Chicago, the suffering cannot cease till the grain is brought into contact with the stomach. There are three methods by which this contact may be effected: (1) the famished men may go themselves and fetch the grain; (2) they may leave this task to those to whose trade it belongs; (3) they may club together and give the office in charge to public functionaries. Which of these three methods possesses greatest advantages? In every time, in all countries, and the more free, enlightened, and experienced they are, men have *voluntarily* chosen the second. I confess that this is sufficient, in my opinion, to justify this choice. I cannot believe that mankind, as a whole, is deceiving itself upon a point which touches its interest so closely. But let us now consider the subject.

For thirty-six millions of citizens to go and fetch the grain they want from Chicago is a manifest impossibility. The first method then, goes for nothing. The consumers cannot act for themselves. They must, of necessity, have recourse to *intermediates*, officials or agents. But observe, at the same time, that the first of these three methods would be the most natural. In reality, the hungry man has to fetch his grain. It is a task which concerns himself, a service due to himself. If another person, on whatever ground, performs this service for him, takes the task upon himself, this latter has a claim upon him for a compensation. I mean by this to say that intermediates contain in themselves the principle of remuneration. However that may be, since we must refer to what the Socialists call a parasite, I would ask, which of the two is the most exacting parasite, the merchant or the official?

Commerce (free of course, otherwise I could not reason upon it), commerce, I say, is led by its own interests to study the seasons, to give daily statements of the state of the crops, to receive information from every part of the globe, to foresee wants, to take precautions beforehand. It has vessels always ready, correspondents everywhere; and it is its immediate interest to buy at the lowest possible price, to economize in all the details of its operations, and to attain the greatest results by the smallest efforts. It is not the French merchants only who are occupied in procuring provisions for France in time of need;

and if their interest leads them irresistibly to accomplish their task at the smallest possible cost, the competition which they create amongst each other leads them no less irresistibly to cause the consumers to partake of the profits of those realized savings. The grain arrives: it is to the interest of commerce to sell it as soon as possible, so as to avoid risks, to realize its investments and take advantage of the first opportunity to buy again.

It is true, the consumer is obliged to reimburse commerce for the expenses of conveyance, freight, store-rooms, commissions, etc., but can any system be devised in which he who eats grain is not obliged to defray the expenses, whatever they may be, of bringing it within his reach? The remuneration for the service performed has to be paid also; but as regards its amount, this is reduced to the smallest sum by competition.

But if, according to the Socialist ideas, the state were to stand in the place of commerce, what would happen? I should like to be informed where the saving would be to the public? Would it be in the price of purchase? Imagine the delegates of forty thousand parishes arriving at Chicago on a given day, and on the day of need: imagine the effect upon prices. Would the saving be in the expenses? Would fewer vessels be required, fewer sailors, fewer teamsters, fewer railways? or would you be exempt from the payment of all these things? The Socialists overlook the fact that society, under a free regulation, is a true association, far superior to any of those which proceed from their fertile imaginations.

170. THE ARGUMENT FOR SPECIALIZATION[1]

By L. D. H. WELD

Much help may be derived from an application of the principle of division of labor and specialization to the marketing process. Farm products, in passing from farmer to consumer, normally pass through the hands of certain middlemen, who may be classed roughly as local buyers or country shippers, transportation companies, one or more classes of wholesale dealers, and, finally, retailers. The need of the local shipping unit, in order to consolidate small contributions of individual farmers into car lots, to furnish storage facilities until time of shipment, and to establish trading connections with city dealers, is

[1] Adapted from *American Economic Review*, V, No. 1, Supplement (March, 1915), pp. 126–28.

apparent. It is the link or links between country shippers and the retail store that many people have in mind when they say that there are too many middlemen.

The need of wholesale produce distributors may best be demonstrated by a consideration of the reasons why country shippers do not and cannot generally sell their goods direct to city retail stores. The reasons are as follows:

1. To procure the greatest economy in local shipments, the quantity sent at one time is too great for most retailers to handle. Retailers carry a large variety of products, and storage facilities for handling large units of various commodities are out of the question. Goods would have to be sent in small allotments, and retailers would have to obtain these small allotments from a great variety of sources.

2. Shipments from local units vary in quantity from shipment to shipment and for different times of year. The city supply of many commodities comes first from one producing section and then from another. The city retailer must be able to buy from day to day in order to correlate his supply with his demand. Furthermore, the shipments from the country at one period will be insufficient, whereas at another period they are much greater than the retailers can absorb. This surplus must be carried by a separate class of middlemen from the period of surplus production to that of insufficient production.

3. The quality of commodities sent by a country shipper is very variable, whereas each retail store has a fairly definite class of trade and must have goods of fairly constant quality.

4. Business relations between country shippers and retail stores are difficult to establish, and once established are difficult to maintain.

5. Retailers are notoriously "slow pay." Country shippers cannot afford to wait for their money, because they must be paying cash for goods as they are brought in by the farmer from day to day. This fact alone has been responsible for the giving up of innumerable attempts to establish direct selling from country shippers to retailers.

These reasons suggest the functions of wholesale dealers. These functions are not generally understood; they are much more difficult to perform and require a much greater degree of organization and business ability than most people realize. Frequently they will be subdivided among two or three different sets of wholesalers, as, for example, a commission merchant, handling goods on consignment, and a wholesaler or jobber; or a wholesale receiver who buys outright, and a jobber who sells to retail stores.

For example, a large proportion of the butter made in the 800 creameries of Minnesota is marketed in New York City, passing first through the hands of a wholesale receiver, and then through the hands of a jobber. The wholesale receiver specializes in the solicitation of shipments from country creameries in Minnesota, the financing of these creameries by allowing them to draw drafts on day of shipment, the handling and storage of large lots of butter on arrival in New York, and the rough sorting out according to quality. These functions naturally constitute a business in itself. The jobber performs an entirely different set of functions: he buys from the wholesale receiver in round lots of say from twenty to fifty tubs at a time; he sends salesmen around to innumerable stores in New York to find purchasers; he sells one tub at a time, selecting just that quality of butter which he knows each retailer, or delicatessen, or restaurant, or hotel, or steamship company wants; he delivers the one tub at a time to various parts of the city; and he very largely finances the retail stores by giving them credit, and undertakes the necessary accounting expenses and losses incident to dealing with scores of small retail shops. All of the many functions now performed by the receiver and the jobber may be performed by one firm—and sometimes they are—but it has been found economical to subdivide these various steps among two sets of middlemen for a large proportion of the trade, each set specializing on one particular class of functions.

Economists have been fond of praising the minute division of labor in the packing plant, the shoe factory, etc., and also the high degree of specialization of industrial plants, whereby one makes pig iron, another makes steel, another structural forms, etc. Often the same men who praise the economies made possible by this "age of specialization," when they hear that there are middlemen called local buyers, commission men, brokers, jobbers, etc., hold up their hands in holy horror and exclaim that there are too many middlemen. Possibly there are in some cases, and yet in still other cases the cost of marketing might be reduced by adding more middlemen. For instance, it would be cheaper for jobbers who buy butter from wholesale receivers and cut it up into one-pound prints, to have their cutting done for them by other firms who could keep their machinery and skilled labor constantly employed in cutting prints. These same jobbers could also save on delivery expense by turning this function over to a centralized or co-operative delivery system, which would eliminate the vast duplication of delivery equipment and constant

covering and re-covering of the same ground by a hundred different firms. There appears to be no reason why this specialization argument should not apply to the creation of time, place, and possession utilities in the marketing process, as well as to the creation of form utilities.

D. Methods of Direct Selling

171. PARCEL POST MARKETING[1]

By LEWIS B. FLOHR and C. T. MORE

Parcel post as a means of transportation has been found by commercial houses to be useful and efficient. There is no reason why farmers cannot make extensive use of it under certain conditions if they will. It has been found that one of the chief factors in preventing the satisfactory development of parcel post marketing has been the price asked by some farmers for produce. To illustrate: One farmer's wife was receiving 20 cents a pound for butter in her local market, a country store. When asked if she would be willing to ship it to a city by parcel post, and at what price, she replied that she would do so at 50 cents a pound. Would-be purchasers frequently have been known to offer producers a lower price than they can obtain in their local markets. It is needless to say that such imperfect and erroneous ideas as to proper and equitable price altogether defeat the possibility of marketing produce by parcel post. Business in marketing by parcel post can be secured and held only by shipping produce of high quality and by charging reasonable prices.

The larger the quantity, within the postal limits, that is shipped at any one time the more economical is the factor of postage and therefore the more attractive from the viewpoint of cost both to the producer and to the consumer. This applies both to shipments and to the return of empty containers. It would not be economical to secure half a dozen different kinds of vegetables from as many different producers, but if a supply of half a dozen kinds of vegetables, or vegetables and fruits, could be obtained in one parcel from one producer it would be both advantageous and attractive.

Another advantage to the producer in parcel post marketing is that his mail box or local post-office becomes his shipping station. This relieves him from any extra trip in order to make shipment, as

[1] Adapted from *Farmers' Bulletin 703*, pp. 9–11, 2.

the rural mail carrier takes the shipment from the mail box or some member of the farmer's family and deposits it at the post-office when going to call for the mail.

Many farmers often have a small surplus of produce, not needed for home consumption, which could be marketed if some ready means of getting it to a consumer were available. The parcel post supplies this medium. There are also many supplemental or side lines of production which could be developed for the same purpose.

Mutual confidence and helpfulness are needed in order to succeed; co-operation is needed. Consumers are interested in buying by parcel post only when they can secure more satisfactory produce, some advantage in price, or both. The producer will not be interested in marketing by parcel post unless it means some additional net return to him. A high quality of produce, well prepared, carefully and attractively packed, and forwarded so as to reach its destination at the time desired will go a long way toward the establishment and continuance of business. Ordinary or inferior produce will not only lose a customer but hinder the gaining of others. The producer must aim to give satisfaction by supplying his customers, as nearly as possible, with produce which meets their individual desires. The consumer must also aim to give satisfaction by properly caring for and returning containers, making prompt remittances as agreed upon, and by doing his part in all phases of the transaction. In other words, a square deal is needed.

Quality and appearance of produce.—It is probable that the point which will make the strongest appeal to the average consumer is that he can secure by parcel post a fresher, brighter, more attractive, and thus possibly a better product than he can obtain otherwise. Producers should remember always that the appearance of fruit and produce is one of the strongest factors in making a sale; it will not pay to market anything but standard and fancy produce by parcel post; and the surest way to establish a dependable, continuing, and increasing business is to forward nothing but strictly reliable and satisfactory produce.

One of the most important requirements is the bringing of the producer and the consumer into business contact. This may be attained (1) by personal acquaintance; (2) through the acquaintance of a third person; (3) by advertising in an appropriately selected paper; (4) by personal canvass; and (5) through the post-office in the city or town in which a customer is sought.

Once a satisfactory parcel post business is established with or through an acquaintance, other customers are likely to be secured through the first one. Advertising frequently may bring the producer into touch with a prospective purchaser. Some papers run a special parcel post advertising department or section, and a brief but well-worded advertisement often will bring results.

Another method is for the producer to make a personal canvass in a residence section of the town or city selected. Good, representative samples of the produce available at the time doubtless will help to secure the first sale.

The postmasters in 35 cities of the country, under the direction of the Post-Office Department, have instituted campaigns intended to foster parcel post marketing. The names and addresses of producers, together with the produce offered, are listed for distribution to the patrons of the offices; and some of these postmasters issue for distribution to producers, lists of consumers who wish to buy.

The cities are as follows:

Athens, Ga.
Atlanta, Ga.
Austin, Tex.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Brooklyn, N.Y.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Dallas, Tex.
Denver, Colo.
Detroit, Mich.
Galveston, Tex.
Hartford, Conn.
Indianapolis, Ind.
La Crosse, Wis.
Lawrence, Mass.
Lincoln, Neb.
Los Angeles, Cal.
Louisville, Ky.
Lynn, Mass.
Minneapolis, Minn.
Nashville, Tenn.
New Orleans, La.
Philadelphia, Pa.
Portland, Ore.
Providence, R.I.
Richmond, Va.
Rock Island, Ill.
San Francisco, Cal.
Seattle, Wash.
St. Paul, Minn.
St. Louis, Mo.
Washington, D.C.

NOTE.—On the following page is shown a sample of such lists.—EDITOR.

VOL. 1 CHICAGO, ILLINOIS, DECEMBER 1, 1915 NO. 8

The following producers have signified their desire to be listed as shippers of produce by Parcel Post. A postal card or letter to one or more of them will afford the consumers an opportunity of making comparison of prices. Every effort will be made to expedite without any unnecessary delay, the delivery of all perishable shipments, thereby insuring to the consumer fresh products from the farm and dairy. The cordial co-operation of the public toward the success of the Farm to Table plan is invited.

D. A. CAMPBELL, *Postmaster*

Name	Address	Kind of Produce
Wm. Awecamp.....	Shobonier, Ill., Route 1	Eggs, poultry
H. H. Aldrich.....	Hamilton, Ind., Route 1	Eggs, poultry, jellies, maple sugar and syrup
J. A. Anderson.....	Etna Green, Ind.....	Eggs, poultry, butter, fruits in season
Mrs. Wm. Binning...	Marathon, Iowa.....	Poultry, cream, eggs, butter, celery
Chas. Beesch.....	Orchard Place, Ill.....	Apples and vegetables
W. B. Burk, Sunny Ridge Farm	Hamilton, Ind.....	Eggs
L. Burchett & Son... Etc., etc.	New Holland, Ill.....	Apples, honey, butter, lard, pork sausage in season

172. ASSISTANCE FROM THE EXPRESS COMPANY



Weekly Farm-to-Table Bulletin

Any agent will take your order.

He will receive it from you personally, by letter or by telephone.

We recommend sending a remittance with each order to cover "Country Cost."

Add money order fee as shown below to the cost of produce order from each shipping point.

Checks on local banks to order of Wells Fargo & Co. will be accepted.

We remit to the farmer by Express Money Order.

Money orders protect both producer and consumer and insure promptness in filling orders.

Orders not over $ 2.50—Money Order fee 3 cents
" " " 5.00— " " " 5 "
" " " 10.00— " " " 8 "
" " " 20.00— " " " 10 "
" " " 30.00— " " " 12 "

"Country Cost" represents the f.o.b. price quoted us by producers.

"Cost Delivered" is "Country Cost" plus express charge on the produce to this city.

Any quantity may be ordered but less than 10 or 15 pounds will not usually be economical.

Article	Shipping Point	How Put Up	Country Cost	Cost Delivered
Pasteurized Creamery Butter				
Pound Prints	Galesburg, Ill.	30 lbs.	.30	.31¼
" "	Lohrville, Iowa	+30 lbs.	.29	.31
" "	" "	10 lbs.	.29½	.32½
" "	Maquoketa, Iowa	+10 lbs.	(Del'v'd)	.32½
" "	Tiffin, Ohio	+30 lbs.	.30	.31½
Combination packages				
Combination package containing twelve (12) dozen eggs and ten (10) pounds of butter from Lohrville, Iowa, is $6.66 *delivered* in Chicago.				
Combination package containing twelve (12) dozen eggs (in Cartons) and eight (8) pounds of butter from Maquoketa, Iowa, is $5.80 *delivered* in Chicago.				
Combination package containing four (4) pounds of butter, four (4) one dozen cartons of eggs, two (2) 1½ pound milk-fed 1916 broilers, $3.55, f.o.b. Tiffin, Ohio.				
Combination package containing two (2) pounds of butter, two (2) one dozen cartons eggs and two (2) 1½ pound milk-fed 1916 broilers, $2.45, Tiffin, Ohio.				
Express rate from Tiffin to Chicago is 26 cents for 10 pounds, 29 cents for 15 pounds, and 32 cents for 20 pounds.				
Fresh eggs	Anthony, Kan.	30 doz.	.23	.27½
" "	Camp Point, Ill.	30 doz.	.23½	.25½
" "	Bolivar, Mo.	30 doz.	.21	.24½
Buckwheat flour	Oakland, Md.	16lb. cartons	.50	.89
Cheese	Monroe, Wis.			
Swiss cheese, per pound			.35	
Bricks (six pounds each), per brick			1.35	
Limburger (two pounds each), per brick			.45	
These prices are f.o.b. Monroe, Wis. Express rate to Chicago on 12 lbs. is 25 cents, on 25 lbs. it is 31 cents.				
Meat			*lb.*	*lb.*
Pork sausage	Thiensville, Wis.	(2lb. pkgs)	*.20	*.22
Bacon	Buffalo, N.Y.	6– 8 lbs.	*.20½	*.23
Bacon	Ft. Wayne, Ind.	6– 8 "	*.27	*.29
Ham	" "	8–10 "	*.19	*.21

+Will ship combination to suit trade of their products. In order to secure products thus marked (*) shown "Cost delivered" the quantity must aggregate fifteen (15) pounds.

173. PUBLIC MARKETS[1]

By J. W. FISHER

Public markets afford a profitable outlet for the farm products of growers located within hauling distance of many large cities. These markets may be either municipally or privately owned. Selling may be either at wholesale or retail, although in many cases both selling methods are allowed. Customarily the sites consist merely of an uncovered tract set aside for this purpose, where space sufficient for the grower's wagon is rented at an average charge ranging from 10 to 25 cents per day. The site may be improved by the erection of sheds or even a specially constructed market house. In the latter instance the interior is portioned into stalls which usually are rented to regular wholesale or retail dealers who buy from the producers.

The grower who sells on the public market has the advantage of being able to ascertain available supplies and thus arrive at a fair market price. He secures the advantage of competitive buying by a large number of dealers who are attracted by a wide variety of products in plentiful supply.

In certain places where municipalities have failed to provide facilities of this character, the growers themselves have organized, purchased tracts of land in the city, and developed their own trading place.

Public markets are important factors in the distribution of farm products in many eastern cities, and although they are not quite so usual in the West, they constantly are receiving more attention.

E. Co-operative Sales Agencies

174. CO-OPERATIVE SELLING OF GRAIN AND LIVE STOCK IN MINNESOTA[2]

By L. D. H. WELD

On January 1, 1914, there were practically 270 farmers' elevators in Minnesota with an aggregate membership of approximately 34,500, an average of 128 members to a company. One farmer out of every five in the state is a member of a farmers' elevator company. The

[1] From *Bulletin 266, United States Department of Agriculture*, p. 10. J. H. Collins and Wells A. Sherman, joint authors.

[2] Adapted from "Statistics of Co-operation among Farmers in Minnesota," *Bulletin 146, Agricultural Experiment Station, University of Minnesota*, pp. 11–18.

aggregate volume of business of these companies for the year following the harvesting of 1912 crop was about $24,000,000, of which about $22,000,000 represents the value of grain marketed, and the other $2,000,000 the value of supplies, such as coal, feed, twine, etc., purchased for members.

Many so-called "farmers' elevators" in Minnesota are not owned by farmers and should not be classed as co-operative companies. Even among the 270 elevators classified herein as co-operative, there are many which certain co-operation enthusiasts would undoubtedly exclude. But in all of the 270 elevator companies farmers own the majority of stock, and in all but 5.5 per cent of them each stockholder has but one vote irrespective of the number of shares owned. Furthermore, in five-sixths of the companies the number of shares that may be owned by one person is limited. In other words, the elevators are not only owned by the farmers themselves, but they are controlled democratically by them.

The patronage or *pro rata* dividend, that is, the division of profits over and above a fair rate of interest on stock according to the business brought by each patron, is highly desirable and should be provided for in the by-laws of every farmers' elevator company. It is in this respect that the farmers' elevators of Minnesota fail to satisfy to the fullest extent the generally accepted essentials of co-operation, because only 26 per cent of the companies distribute profits in this way. There is some doubt about the desirability of laying so much importance on the patronage dividend, however, as an absolutely necessary feature of a co-operative organization. If an organization is run on a no-profit basis, as in the case of the great majority of Minnesota creameries, there is nothing to be distributed on a patronage basis. In co-operative stores, on the other hand, the patronage dividend is an absolute essential, because the only safe way to operate a store is to charge current prices as do competitors, a policy which, if the store is well managed, should yield a profit over and above a fair return on capital invested.

The farmers' elevator occupies a middle ground in this respect; under able management it can often be operated on practically a no-profit basis, but there are certain risks, especially in the handling of such grains as barley and flax, which render it dangerous to shave the margins too close, and the usual method is for elevators to pay current prices as shown in the daily grain bulletin. If the farmer's grain is graded and docked correctly by the manager, there should normally

be a profit, and hence the patronage dividend is a desirable feature. Out of 139 companies reporting dividends paid on stock, 59, or 42.4 per cent, paid no dividends, 14.2 paid rates from 2 to 7 per cent, 30.9 per cent paid at the rate of either 8 or 10 per cent, and only 12.7 per cent of the total number paid rates above 10 per cent. Although several of the companies which paid no dividends actually lost money, most of them had small profits which were thrown into reserves. Of those that paid dividends, 10 per cent was the commonest rate. Out of the 42 elevators that have the patronage dividend, 16 pay stock dividends or 10 per cent before distributing anything on a patronage basis, and 13 pay 8 per cent. In other words, 8 or 10 per cent is apparently considered a fair return on capital invested. The highest rate of dividends paid by any elevator was 125 per cent, but this elevator has since changed to the patronage basis.

The majority of farmers' elevators undertake the co-operative purchase of supplies, such as coal, flour, feed, binder twine, seeds, etc., for their patrons.

The most important recent development in co-operative marketing in Minnesota is the formation of live-stock shipping associations, and in this respect also Minnesota is by far the leading state in the country. The movement began in 1908 and has been spreading very rapidly, especially since 1911. The number of associations is placed at 115 on January 1, 1914, but many have been organized since that date. The total value of live-stock marketing through these associations can only be estimated. The average for 61 associations in 1913 was $59,692 per association, but many of these associations had been formed during the year and hence their reports cover less than twelve months. The estimated figure of $6,000,000 would seem to be fairly conservative. This amounts to about 12 per cent of the value of live-stock marketed by Minnesota farmers.

	Total	Average per Association
Carloads of stock marketed	4,500	44.7
Cattle marketed	3,300	329
Hogs marketed	250,000	2,372
Calves marketed	30,000	465
Sheep marketed	15,000	192
Average expense per association		$2,760
Average expense per 100 pounds		$ 0.33

It will be observed that the average expense per 100 pounds is 33 cents. This includes not only the freight (usually to South St. Paul), yardage, switching, commission, etc., but also the salary of the manager of the association, who is ordinarily paid on the basis of a certain amount per hundred weight (usually 6 cents), as well as a small amount commonly set aside from each shipment for a sinking fund. Under the old method of marketing live-stock through local buyers, the margin between the farmer and the purchaser at the terminal market is much greater, running from 40 to 75 cents per hundred pounds, and sometimes higher. By assuming 50 cents as an extremely conservative estimate, the shipping associations saved the farmers of Minnesota over $1,000 per association in 1913. In view of the fact that there is no investment of capital necessary, and since this estimate is very conservative, the economic value of shipping associations becomes readily apparent.

Co-operative creameries and cheese factories are also to be classed as marketing agencies. Of the former there are 614 and of the latter 34 in Minnesota. Seventy-two per cent of all creameries in Minnesota are co-operative, and there is no other important dairy state where the butter industry is controlled to such an extent by the farmers themselves.

175. CO-OPERATIVE MARKETING OF VEGETABLES[1]

By L. C. CORBETT

Co-operation among growers of vegetables solves the problems of the package by making it uniform and standard, it guarantees the pack by employing competent inspectors, and insures uniformity of grade. Co-operative action enables the co-operators to act as an independent individual, and since they employ a uniform package, a standard pack, and uniform grades a given product of a community can be shipped in carload lots at a lower rate than is possible by local freight or express, thus effecting a decided saving. A uniform package and a standard pack and grade give a product a standing in the market which enables it to be sold for what it really is, because the guaranty of the association is behind it.

Another advantage which often follows is a local or direct sale, f.o.b. shipping point. In the eastern portion of the country the f.o.b. sales have been made on the basis of New York prices current. The

[1] Adapted from *Yearbook of the Department of Agriculture*, 1912, pp. 355–61.

distribution of products to many consuming centers rather than congestion in a few is one of the most valuable results secured by cooperative action. Cities which are large enough to handle a single commodity in carload lots when it is purchased from the producer receive their goods direct rather than by a diverted shipment or by reshipment. The product reaches the market quicker and in better condition, and the price to the consumer or to the handler in the small town is reduced by one freight charge and sometimes also by the cost of commission or jobber's profit. One association has been able to sell over 90 per cent of the truck handled by it f.o.b., and this has resulted in a saving of over $150,000 annually on a $2,000,000 business. In other words, the freight charges were paid by the purchaser instead of by the producer, thus saving to the community the cost of transporting their products to the centers of consumption or distribution.

Towns too small to handle "straight" cars of a single commodity, with the possible exception of potatoes, can be served in the same manner as large towns by a system of loading which has been devised by some of the railways receiving products from the trucking districts. This system consists in loading mixed cars to order, so as to supply the needs, as near as may be, of the town to which the shipment is made. This method of handling mixed cars accomplishes a very desirable result, in that it widens the distribution of the product by reaching towns too small to handle solid cars of a single commodity and enables the dealers to purchase direct from the producer, thus insuring all the advantages of direct shipment possible by any other system of carload shipments. By the adoption of a carefully planned cropping system in the several producing centers from which such shipment is to be made a very satisfactory arrangement for both the producer and the consumer can be worked out.

If the products of various centers are to follow in succession to the same markets and are to be handled on the basis of sales f.o.b. shipping point, the producers must not only maintain standard packs and grades which are uniform, but they must also be in touch with the markets in such a way as to insure prompt and satisfactory disposal of their products. At present this is accomplished by wide-awake, active dealers who know the markets and the producers as well, and by purchasing in one locality in January, in another in February, and so on from season to season, thus keep their customers supplied from the beginning to the end of the period. Neither independent producers nor associations of growers with fixed fields of production can

do this. They reach the market only during the period their crops are moving. What is accomplished by the independent dealer might, however, be accomplished by co-operation among various local associations of producers. Through a federation of such associations a marketing expert might be maintained who would move with the season from one center to another. By so doing, the markets would deal continually with the same individual, the grades and packs would be uniform, because censored by the same authority at each loading point. In this way the community might accomplish for itself what is now taken advantage of by shrewd and wide-awake dealers.

Under the system of independent action producers are creatures of circumstances over which they have no control. At harvest time they have little conception of the competition they will have to meet in the market, unless the crop is so short that it has become a matter of comment. As a rule the dealers see to it that the reports on crop prospects are high enough to enable them to buy the harvest at a reasonably low figure. It is never discovered that the crop is a little short until after it has all left the hands of the grower and is safe in the storerooms of the dealers.

Dealers keep an accurate forecast of the crop and as a rule have a good basis for their action. Growers have not done this except in a few instances, and then with marked advantage. Co-operative growing associations should establish through some central organization a plan by which accurate forecasts of crop prospects can be furnished. These forecasts should begin with the acreage in each crop zone and end with a statement of the harvest. These reports should be made at frequent intervals and should be based on accurate personal canvass by competent judges. A few seasons' records for any given locality will suffice to furnish a basis for determining the safe acreage for that section and to fix the planting and harvest dates, as well as to indicate the normal product which may be expected from a given acreage. Statistics of this character would provide a basis for working out a rational system of crop rotation and crop production.

Co-operative action with products which can be stored enables the producer to distribute the product throughout the consuming period in such a way as to meet the requirements of the market without overloading it and depressing prices. With vegetable products, such as Irish potatoes, sweet potatoes, and squashes, this is a very important consideration; the trade quickly determines the center of supply, and as soon as the markets create a demand the supply can be forthcoming

in a regular, systematic manner, so as to cause the least loss to producer, handler, and consumer. Under this system storage products should never be compelled to beg a market; the demand will always find the supply. The chief advantages, therefore, of co-operative action are standard grades, standard packs, uniform packages, shipment in carload lots, f.o.b. sales, a controlled rate of dispersal, predetermined destination, dispatch in the settlement of claims, and regulation of rates of transportation and of sales, so as to give each producer a standard price for a standard product.

To accomplish this is a difficult task. Human nature is the most variable and the least controllable commercial commodity. Co-operation means united action, and true co-operation in the sense in which it is used in this connection means united action for the benefit of all concerned—the producer as well as the consumer. Co-operation which involves financial risk and financial responsibility has never proved successful when based on fraternal agreement alone. To succeed in any business enterprise which requires the concerted action of individuals of different training and different temperaments, there must be a common bond of union of sufficient importance to give them a common interest. This can be secured in the business world only through a money consideration. In order, therefore, that co-operative action involving the growing, handling, transportation, and sale of perishable products may be successful it must carry a financial obligation sufficient to command the interest of the co-operators. It is true that in an association of this character the participants place at stake the return of their labor in the form of the crop produced, but in order to insure the patronage and the loyalty which is necessary to the stability of any co-operative action a membership requirement must be made sufficiently large to prevent a member from withdrawing from the association for slight cause. A method which has been successfully used in some of the associations is to require a cash membership fee sufficient to raise the required capital for conducting the business of the association.

The amount of capital stock will vary with the character of the association, whether it be a growing and distributing organization or a growing, distributing, and purchasing organization. In order to purchase supplies for its members the organization will require a much larger capital than will be necessary for a growers' and distributors' organization. That would be in the neighborhood of $2,000, while the stock necessary to add the purchasing and handling feature must

be from $10,000 to $50,000. The cash membership fee should in few instances be less than $25. If the requirements of the association demand larger capital the membership fee must be increased proportionately. In addition to the cash membership requirement a bond should be given in the form of a promissory note executed by each member in favor of the association, this bond to be held in trust as long as the member remains in good standing, to serve as a guaranty for faithful adherence to the constitution and by-laws of the association.

The benefits of co-operative action in growing, transporting, and selling farm products cannot be fully realized unless the members of the association each and severally consider themselves delegated to protect the interests of the association from criticism or dissension from within, which would tend to limit the usefulness of the association, and they should also safeguard their community interests by discouraging the formation of competing associations. Co-operative competition is equally as destructive as individual competition. Unfortunately, in some instances growers have not realized that the formation of competing organizations, although each of them is co-operative in its nature, is destructive to the best interests of the community as a whole. In fact, the organization and development of factional or competing associations in a community have been one of the favorite devices of those antagonistic to the success of the co-operative movement.

The basis on which the association secures its revenues is an important consideration, as is also the method of settlement with its members. Revenues are essential to meet salaries and legitimate operating expenses. The income of the association may be derived from a commission on sales or from a flat rate per package for goods handled. Either of these systems will prove satisfactory. The one which seems to meet best the requirements of a particular association should be adopted. In some instances the moneys received from the sale of products, less a commission or deduction for the charge of selling, are returned direct to the individual furnishing the products. In other instances, where the products are given a uniform brand and are sold on grade, so that the individual's product is lost sight of, the returns for a given period are pooled and are prorated among those contributing to the sales during that particular period. A short pooling interval is desirable in order that growers who succeed in producing early crops, which often command a higher price, may be given the benefit of this advantage.

Since high-grade talent must be secured in connection with the successful development of the co-operative marketing system, most organizations have found it advantageous to extend the activities of the institution to the purchase of consumable supplies. The object is to provide profitable continuous employment for a competent manager, rather than to attempt to operate on an intermittent plan. Competent executives cannot be had except on a permanent basis. It is evident, therefore, that unless the activities are extended few associations will be able to afford high-grade management.

F. Government Market Bureaus

176. CALIFORNIA'S "STATE COMMISSION MARKETS"

a) THE LAW[1]

The people of the State of California do enact as follows:

SECTION 1. There is hereby created the state commission market, a state organization to carry on the business of receiving from the producers thereof, the agricultural, fishery, dairy, and farm products of the State of California and the selling and disposing of the same on commission, as herein provided.

SEC. 2. The state commission market shall be under the management and control of a governing body of one person, to be known as the state commission market director, who shall be appointed by the governor of the State of California.

SEC. 3. The commission market director shall establish and maintain in any and all cities and towns in the state where and when the conditions are in his judgment most suitable, depots or stations to be used as commission markets, for the receiving, care, sale, and distribution of the agricultural, fishery, dairy, and farm products of California, and the director shall establish and maintain an executive office or headquarters at Sacramento.

SEC. 4. The commission market director shall make all necessary rules and regulations, and change the same when necessary, for the operation and carrying on of the state commission market, and shall print the rules for free distribution to all persons who wish to avail themselves of the privileges of the market, whether buyers or sellers, and all buyers and sellers shall conform to such rules and regulations in order to claim any right under this act.

[1]Chap. 713, Acts of 1915 (Assembly Bill No. 318). Approved June 10, 1915.

SEC. 5. All producers of agricultural, dairy, or farm products, or products manufactured or processed therefrom, or fishery products, which shall have been grown, raised, produced, processed, or manufactured within the State of California, or caught in the territorial waters thereof, shall have the right to consign and deliver such products to the state commission market, at any of its depots or branches, for sale and distribution.

SEC. 6. The state commission market shall receive and care for all produce consigned and delivered to it under the provisions of this act, and shall sell and distribute to dealers, consumers, and all buyers such products to the best possible advantage of the producer; and, to the end that the state commission market be self-supporting, shall charge a commission for the handling of all products in an amount which in the judgment of the director is just and reasonable. All settlements with producers shall be made once a month or oftener, and the market shall retain the commission charged.

SEC. 7. The director shall have power to rent, lease, occupy, and use all such lands and buildings as may be needed.

SEC. 8. The market shall have a bureau of correspondence for gathering and disseminating information on all subjects relating to the marketing of California products, and shall issue booklets thereon, and by every practicable means keep the producers informed of the supply and demand and at what market their products can best be handled.

SEC. 9. The term of office of the director shall be four years or until his successor be appointed by the governor, and the annual salary of the director shall be five thousand dollars. The first appointment of director shall be made upon this act going into effect. The legislature, by a two-thirds vote, may remove the director for misconduct, neglect of duty, or incompetency.

SEC. 10. The state commission market shall have a secretary, who shall be appointed by the director and hold office at his pleasure, and shall perform such duties as he may prescribe. The annual salary of the secretary shall be three thousand six hundred dollars.

SEC. 11. The market shall have a seal, bearing the inscription "State Commission Market of California," which seal shall be affixed to all such instruments as the director shall require.

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SEC. 13. The director shall not engage in any other line of business during his term of office, but shall devote his whole time, attention, and ability to the duties of his office. The director shall not hold any stock or other interest whatsoever in any produce commission business.

SEC. 14. There is hereby created a fund to be known as the "state commission market fund." All fees, charges, and costs collected by said market under this act shall be paid into the treasury of the state to the credit of such fund. All appropriation made by this act or any subsequent act for the use of the market, shall be placed to the credit of such fund. All expenses of whatsoever nature, incurred by the market under the provisions of this act, shall be paid from the said fund, after being approved by the director, upon claims therefor to be audited by the board of control.

SEC. 15. There is hereby appropriated out of any money in the state treasury not otherwise appropriated, the sum of twenty-five thousand dollars, to be used by said director in establishing and carrying on the state commission market provided for by this act.

SEC. 16. The director shall make [annual report]

SEC. 17. The director [shall give bond]

SEC. 18. Sufficient commission for the handling of produce shall be charged by the market to gradually build up a revolving fund in a sum equal to the original appropriation, such fund to be used as required in the operation or extension of the market.

b) THE MARKET DIRECTOR'S VIEW OF HIS TASK[1]

By HARRIS WEINSTOCK

To carry out this broad and comprehensive scheme, the legislature has appropriated (as a mere beginning, I take it) the sum of $25,000. Of course, if the Market Director were to attempt to carry out the full letter of the law, in the hope of handling the $200,000,000 or more of the farm products of California, it would require on the part of the state, for warehouses alone, an investment of millions.

Speaking for myself, I should not deem it expedient for the state needlessly to make such investment, and to involve itself in all the burdens and responsibilities inseparable from wholesaling and retailing farm products. The time may come when this may be necessary, but, in my opinion, the time is not at hand. The hope that I have

[1] From a circular "To the People of California," December 1, 1915.

in mind, along the lines of remedying existing marketing evils, lies, among other lines, in the utilization on the one hand of existing machinery for the distribution of farm products and, on the other hand, to aiding and directing the producers scientifically to do their own marketing. The state will have performed its highest function, in my opinion, when it will have aided the producer to help himself.

What better object-lesson is needed to show the evil results of a lack of organization and the beneficent results of organization than is presented by the California raisin industry? Only a few brief years ago the grower was obliged to sell at as low as one and a half cents a pound, which, of course, meant ultimate ruin. By perfecting a selling organization, he is now receiving between three and four cents a pound, which means a living price and all that a living price spells. The California citrus industry presents perhaps the most remarkable object-lesson of the benefits of collective action, but there must be collective action, not alone on the part of 60 per cent of the producers, as now in the citrus industry, but on the part of producers of 100 per cent of the product. It should be one of the aims of the Market Director to bring about such collective action on the part of the 100 per cent of the producers, and to this end I now dedicate myself. Even though such result may be unattainable, it is certainly worthy of most earnest effort, because the success of such effort means the salvation of the industry.

There are two distinct markets for the farm products of California: the market in California, which may well be called the "home" market; and the market outside of California, which may be called the "eastern" market. The records show that the home market consumes only about 5 per cent of the farm products of the state, the remaining 95 per cent being consumed outside of the state. It must, therefore, be plain that the situation which should command first attention is the eastern market; since it is not possible for any one market director to cover all the territory for all the products as speedily as all the producers would like to have it covered, it is evident that a great deal of patience and forbearance will have to be exercised on the part of many of the producers, until their time shall have arrived. It is my intention to concentrate upon such products as are chiefly marketed in the East that most need attention—such, for example, as the dried peach product, the olive product, and the citrus products. After carefully surveying the ground and after thoroughly familiarizing myself with eastern marketing conditions (which I am now engaged

in doing), I shall be better able intelligently to decide upon which product first to concentrate.

Singly and alone I can, of course, hope to do very little. My chief success must come from winning and holding the earnest and hearty co-operation of the producers and distributors; without their support, failure is inevitable; with their support wonders can be accomplished. The present is the first Market Commission created in California and I am the first Market Director ever appointed in California. I have no precedents to guide me. The work right from the first hour must be creative and constructive in character. I doubtless shall make my fullest share of mistakes, but I am sure that my friends will regard them as mistakes of the head and not of the heart, and I am also sure that I will earnestly endeavor to avoid repeating the same mistakes. One of the avenues from which I hope to obtain much support and much aid is along the lines of an advisory board. This advisory board, as the situation now looks to me, will be composed of fifteen directors of the California Development Board, with its group of merchants, bankers, manufacturers, and transportation experts, to which may be added an equal number of representatives of the organized producers of the state, from which joint group a committee may be created to deal with each separate phase of the problem as an aid and as advisors on the marketing commission.

Undertaking this task as I do, with an open mind, I shall heartily welcome all hints and suggestions, no matter how humble may be the source from whence they come. I know that much will be expected from the Market Director; I know that I myself have established for him very high standards. If I can only in a remote way approximate the expectations of the producers of the state and the standard which I have established for myself, I shall feel that my work will not have been altogether a failure.

And now, as I go to the task assigned me, I shall give to it the best that is in me. All that the years of my business training have taught me, all that I have learned in many kinds of public service, and all of the ideals which have guided me in both private and public life, are hereby dedicated to this service. All that I ask in return is some small recognition of the simple fact that I am trying to render an exceptionally difficult service, and that I shall need the forbearance and the support of all producers, distributors and consumers who realize what the success of this new state commission market can be made to mean to the entire state.

177. WORK OF THE OFFICE OF MARKETS AND RURAL ORGANIZATION[1]

By CHARLES J. BRAND

It is believed that effective and economical methods for distributing and marketing farm products should go hand in hand with scientific methods of production, as it profits little to improve the quality and increase the quantity of our crops if we cannot learn when, where, and how they may be sold to advantage. To provide for a study of the problems involved, Congress during the spring of 1913 appropriated funds for the establishment and operation of the Office of Markets of the Department of Agriculture. The Office of Rural Organization was established by Congress a year later, in order to determine the possibilities and encourage the use of organized co-operative effort in improving rural conditions. These two offices were combined on July 1, 1914, and the combined unit is known as the Office of Markets and Rural Organization.

The authority conferred by Congress in appropriating funds for the maintenance of this Office provides "for acquiring and diffusing among the people of the United States useful information on subjects connected with the marketing and distributing of farm and non-manufactured food products and the purchasing of farm supplies," and the study of co-operation among farmers in the United States. So far as marketing work is concerned, the activities of the Office, therefore, are limited to the collection and distribution of information. For example, it has no authority to prosecute cases of alleged dishonesty on the part of producers, carriers, dealers, or buyers. It has nothing whatever to do with the problems of production.

It has been found that co-operative marketing has been carried on in the United States to a much greater extent than was supposed. It has been estimated that over a billion dollars' worth of agricultural products are sold each year by co-operative marketing organizations. The investigations undertaken include a study of successful buying and selling organizations in this and foreign countries to discover their strong and weak points and the reason for the failure of organizations which have been unsuccessful.

To be successful in eliminating wastes the cost of each step in the marketing and distributing of agricultural products must be accu-

[1] Adapted from an announcement of the Office of Markets and Rural Organization.

rately ascertained. Wastes and excessive profits must be discovered before they can be eliminated. For this reason the Office of Markets and Rural Organization is conducting investigations of the business practices of co-operative and non-co-operative marketing, distributing, purchasing, and rural business organizations, and other agencies engaged in the marketing, distributing, and storing of farm products, paying especial attention to office organization, accounting systems, methods of auditing, office appliances and equipment, and plans of financing. Systems of accounts are being devised for various types of organizations and other agencies; one for co-operative grain elevators has been completed, tried out successfully in actual operation, and now is available for use. Over 200 elevators have made arrangements to instal this system this year. Other systems have been devised for fruit exchanges, produce associations, live-stock shipping associations, and poultry circles. After a thorough test of their practicability the accounting systems devised by the Office are made available for all, and when practicable active assistance is rendered in their installation. Systems of accounts also are being outlined for firms doing a commission business in agricultural products, with the view of devising something which may be adopted ultimately as a uniform system by the trade.

Marketing surveys are also being undertaken, in order to secure accurate and comprehensive data concerning market methods and costs and to ascertain the practicability of a market news service. This part of the work includes surveys of the consumption of specific products in definite localities, as well as a determination of the market produced within certain shipping areas. An important part of the investigation is a study of the relation of prices to receipts in important distributing centers, with a view to determining the point at which the market becomes glutted, the prices falling so low as to render shipments unprofitable.

Investigations of present methods of gathering, handling, grading, packing, and shipping farm products to determine their relative efficiency are being carried on. Their purpose is to secure the education of the producer and shipper as to best methods and as to the value and necessity of fixed market standards and strict grading.

In the case of perishable products every handling is conducive to additional deterioration, and every change of ownership or possession means, as a rule, added costs. It is planned to trace products from the time they are received in the city until they are in the hands of

the consumer in an effort to locate the sources of waste, record the unnecessary changes of ownership, and also to study the work of each type of dealer and the cost and efficiency of his service.

The Office has undertaken to render assistance both to individual producers and shippers and to associations of producers or consumers in difficulties relating to the transportation of farm products. As a rule, this assistance has been along general educational lines. The Office has not attempted to act specifically with carriers as agent for any person or association. Many communications have been sent in the effort to explain to shippers technical details concerning railroads and their methods. The endeavor has been to put them in a position to handle their business with common carriers in an intelligent manner. For the most part it is believed that better service is rendered the public by helping them to help themselves in such matters than by taking charge of the whole affair for them. Cases may arise however, in which it would be advisable for the Office to handle directly with shippers and carriers all of the details of some transaction, and in such an event it will undertake to do so as a demonstration, especially when better results can be obtained and the educational value of the service to shippers can thus be increased.

Special investigations are also being undertaken concerning the possibilities of marketing by parcel post and express, marketing livestock and meats, dairy products, and cotton and its products. In connection with this last project, experiments are made to determine the relative commercial value of pure-bred varieties of cotton and the percentage of moisture in cotton at the gins, compresses, and other concentration points. Primary market surveys are undertaken to determine geographical production, the quality and variety of long-staple cottons, and other matters. An effort is made to demonstrate to cotton growers the advantages of organizing co-operative marketing societies to handle cotton in even-running commercial quantities, and to assist them in forming these associations. Illustrations of results already obtained in this work are afforded by organizations of cotton planters which have been formed in Arkansas and Arizona. More direct dealing between grower and manufacturer is promoted in order to reduce to a minimum injurious and unnecessary handling of cotton. Investigations are made of the present methods of handling, marketing, and utilization, and studies are carried on regarding the establishment of standard grades and the standardization of conditions under which cotton seed and its products are handled and stored. In the cotton

warehousing investigations, studies are being made of such subjects as insurance rates on cotton in storage and the results, including better arrangements for financing, to be derived from conserving cotton in storage houses; the construction of different types of warehouses; and the relation of present methods and practices of compressing cotton to warehousing. Special attention will be given to co-operative storage companies with a view to aiding such organizations when advisable. Investigations will be made to determine the relation of warehouse facilities to the financing of the cotton crop and the interest rates on money loaned on cotton, as well as the relation of the various methods and practices of compressing cotton to storage capacity, insurance rates, and economy in handling and transportation.

178. MARKET ORGANIZATION ON A NATIONAL SCALE[1]

By DAVID LUBIN

The Landwirtschaftsrat of Germany begins with the township organization. Every farmer who owns land has a portion of his tax assessment set aside for the support of the Landwirtschafstrat. This gives him the right to vote for a chamber of agriculture in his township. The township organization elects its representative to the county organization. The county organization elects the members to the state organization, and the members of the 24 state organizations of the German Empire elect their national Landwirtschaftsrat, consisting of 72 members.

To begin with, the 72 members of the Landwirtschaftsrat have their seat in Berlin. They, in substance, have the right of initiative and referendum touching all laws that directly or indirectly concern agriculture. The imperial laws of Germany direct that the Reichstag must submit these laws to the Landwirtschaftsrat for its opinion.

But this is by no means all or the most important of its functions. The township, county, state, and national organization is, in substance, a semi-official information bureau for the purpose of the scientific marketing of agricultural products.

The membership of this organization consists of several million units. Its semi-official status gives it the power to swing the distributive end of German agriculture, and thus renders trusts in food products in Germany an absolute impossibility. This is an invaluable service not merely to the farmers but likewise to the consumers of Germany as well.

[1] Adapted from a hearing before the State Department, June 21, 1915.

In my opinion, this system is the cornerstone, the secret, the reason of the transcendent strength, of the German Empire. Let us not be mistaken; the great strength of the German Empire does not come from the "goose step" of her soldiers nor from her Krupp guns; it comes as a direct and indirect result of her Landwirtschaftsrat system for the scientific distribution of her agricultural products, of the food products of Germany, all of which is reinforced by her effective and efficient rural-credits system.

I will now take up the details of the Landwirtschaftsrat and its adaptation in the United States. There is to be a series of organizations of various degrees, all federated into one great organization semi-official in character. Like in a pyramid, it will consist, as it were, of different layers. Beginning with the apex there will be the national commission; then the wider layer below that, the state commissions; or the still wider layer below that, the county commissions; with the widest layer at the base, the township commissions.

There is, first of all, to be a national commission, say, of fifteen able representative farmers and fourteen other men not necessarily farmers, but leading men. Let us say that one is an eminent carrier, the president of a railway company; then, say, an eminent financier, a well-known banker; then, an eminent man having a knowledge of interstate-commerce relations, an Interstate Commerce Commission man; then, an ex-postmaster-general, say, with a knowledge of parcels post; and others, captains of industry, men who deal in large matters of business. Thus the fifteen farmers and these fourteen business men would compose a national commission of twenty-nine.

This commission, say, with headquarters in Washington, would meet in session for a few days, say, once or twice a year, passing upon all measures and by-laws necessary to govern the national organization. Under this commission there is to be a secretary-general with his staff, who are to constitute the working bureau. This bureau is to have its headquarters in which to carry on the work the year round. It is this secretary, with his staff of assistants, these bureaus, who are to do the work.

A similar commission to this national commission, with its secretary and working force, is to be constituted for each state in the Union; that would be the wider or second layer of the pyramid.

The third and still wider layer is a similar commission for each county in each of the states of the Union. And, finally, the last and widest layer is a similar commission for each of the townships in each

of the counties of the state in the various states of the Union. The national, state, county, and township organizations, when confederated, would consist of several million units.

The collective organizations would properly be designated the "national marketing organization." Such an organization would be to industry and agriculture what the chambers of commerce, boards of trade, mercantile agencies, and clearance houses are to commerce and finance. Remove all these from commerce and finance and you will soon produce decay, failure, and revolution. All these are absent so far as the industry of agriculture is concerned. The proposed national marketing organization would supply them.

Once put the national marketing organization in operation and there will be no need to grope in the dark or to guess where to sell and when to sell and how to sell.

Toward this end the working bureaus could bring into play all the modern means of up-to-date business facilities. They could employ the telephone, the night-letter telegram, and card-indexing system. The communications could be regulated to come from the township to the county organization, from the county organization to the state organization, from the state organization to the national organization. The national organization could be in touch with the local markets, with the markets throughout the states, and with the market centers of the world. Each producer would thus be enabled to see, not merely with his own eyes, as at present, but with the help of four or five millions of his fellow-workers' eyes. Where now there is commercial ignorance and darkness, there would then be commercial knowledge and light. At the present time each producer's lack of knowledge causes him to grope around in a limited territory full of cul-de-sacs, but under the proposed national marketing organization the farmers everywhere would have the same light and intelligence in the commercial end of agriculture as merchants and financiers have in the business of commerce and finance.

MR. SMITH: It might be contended that this system would create an organization so powerful as to become a dangerous political factor.

MR. LUBIN: You would be quite right if the contemplated organization were a government institution, but this should not be.

MR. SMITH: You would have the proposed organization to be free from any governmental action?

MR. LUBIN: No; not that, either. If this were a governmental institution it would lead to political centralization, when, presently,

the government would become autocratic to an extent that would nullify its republican and democratic status. If, on the other hand, it were absolutely disconnected from any government influence, it would then not be possible to materialize itself. There would then be nothing to prevent any number of competing organizations from springing up with like powers and functions. Were such to be the case it would soon neutralize the power and effectiveness of all these organizations, the same as it does now in the United States and as it formerly did in Germany.

The chief merit of the German system consists in the fact that the Landwirtschaftsrat is a semi-official organization. I wish to emphasize the word "semi-official." While the German Landwirtschaftsrat exists under the imperial laws of Germany, and while its operations must conform to those laws, there is no jurisdiction between this organization and any cabinet ministries of Germany. The Landwirtschaftsrat, while under government law, is not a servant or adjunct of the government. Apart from obeying the few fundamental and simple by-laws inscribed on its charter by the government, it is in all other respects autonomous. In the place of being subject to a department of the government, it is, on the contrary, a critic of the government; in other words, it is semi-official.

Being composed of a membership of millions of units, units composed of all political shades, there would then be no danger of wielding this organization as a special political party machine, not any more so than it would be possible to utilize politically the members of the chambers of commerce or boards of trade.

Last fall I had occasion to travel around in Massachusetts in an automobile. On the road I saw in the fields heaps of apples on the ground. There was no market for the apples, anyone might take them, they were lying around on the ground rotting. Out in California, at Lodi, I had a talk with the owner of a large vineyard. He gave me to understand that, so far as production was concerned, thanks to the scientific information from the Department of Agriculture, there was nothing to complain of; that by skilful pruning and cultivating he had increased production a ton to a ton and a half an acre; but when asked about distribution, with regard to the sale of his wine grapes, that was a different story. The wine grapes from which the "vin ordinaire" is made are worth about $30 a ton in Italy, France, or Spain. They used to be worth from $30 to $40 a ton in California, but the organization of wine-makers, through combination, have

brought the price down to $25, then to $20, then to $15, then to $10, and just now to $7.50 a ton. Now, multiply these instances as they occur on the farms of the North, and of the South, and of the East, and of the West, and what are we doing? We are squeezing out the life and the spirit of this nation, the better things that go to make a republic, that go to make a great and mighty nation.

Were the founders of the Republic here, the fathers of the Revolution, were they to see our conduct in this respect, they would not hesitate to denominate this as political hypocrisy. We are simply selling our birthright for a mess of pottage. Before we may make our country a strong and enduring political entity we must make strong the conservative element in the United States, the producer, so that he may be a match, an equal match, in the political tug of war with the city progressive, the consumer, the city radical. This, and this alone, will make a strong and enduring Republic. If we leave this undone, then all the warships and all the navy and all the army, however grand and strong, will not save the Republic. But if we balance equally the strength of the country conservative with the city progressive we make a great nation, not great in bombast, but great in reality. That is the secret of the strength of Germany.

MR. SMITH: As I understand it, then, the object is to procure an equitable distribution of agricultural products through well-directed intelligence—to employ the best means for the placing of the surplus crops in the localities where they are needed.

MR. LUBIN: Yes; intelligent and equitable distribution.

MR. SMITH: I think I now understand what you mean.

X

TRANSPORTATION AND STORAGE FACILITIES AS FACTORS IN THE MARKETING OF FARM PRODUCTS

Introduction

It is a commonplace observation that American agriculture has been dependent at every stage of its development upon the extent and character of transportation facilities available at the moment. The Colonial tobacco planter must keep near enough to the streams so that he could roll his product in hogsheads to the local boat-landing. The pioneers of the Ohio Valley were hard put to it to market their products till the early canals gave them cheap access to the eastern ports and consuming centers. The farmers who crossed the Mississippi soon found how thoroughly their fortunes depended upon the building activities and the rate-making policies of the railroads. Today the competition of the various agricultural regions of the country is not upon the basis of their ability merely to grow certain crops, but upon the basis of their ability to lay these goods down in a certain condition and with a certain cost of delivery in the markets of this or other countries.

Indeed our whole industrial organization has been built up upon a basis of cheap transportation of agricultural products. This has made possible on the one hand the extreme specialization along manufacturing and industrial lines of certain countries and favored regions, and on the other hand a similar specialization by different agricultural regions in those lines of production for which they were especially fitted. England's industrial supremacy, at the expense of a neglected agriculture, would have been quite impossible except for the cheap transportation of food-stuffs from regions where they could be cheaply grown (see selection 179). The piling up of dense populations like that of Massachusetts or the extreme congestion of cities like New York are limited by the possibility of our transportation systems to furnish them with quick and economical contact with wide sources of food supply. Much of the recent talk of high cost of living and investigation of city marketing arrangements is an expression of the fact

that we are already pressing against the barriers to further concentration of population (see selection 188). At the other end of the line, however, we are rapidly developing possibilities for cheaper and better transportation of goods over even the longest distances. The improvement of country roads is by itself a thing less spectacular but probably not less important than the building of the Panama Canal. Better picking, packing, and handling of perishable products, the large-scale handling of the staples, the kiln-drying of corn, pre-cooling of freight cars, and countless other improvements are enlarging the zone and lowering the cost of modern transportation. Space permits the touching of only a few of the many phases of the movement (sections B and C).

And, just as transportation facilities serve to equalize our agricultural products in place, so storage facilities help to equalize them in time. Equipped with adequate warehousing arrangements, we are in a position to make the labor of the growing season provide with equal bounty for the entire year. Such facilities likewise enable the producer to offer his supplies at the moment when demand is immediate and price offers are at their height. To be sure, the possibility of storing goods presents also the possibility of securing control of supplies and of exploiting this control in terms of speculative prices. But such control is very strictly limited in any line where production continues in the hands of a great body of independent operators, as is always the case in agriculture. These limitations are well set forth in selection 191. On the other hand, it is often argued that it would be distinctly to the farmer's financial advantage to retain control of his crop until consumers' demands are ready to take it, and thus secure whatever advantage the market presents, instead of allowing this to pass to the buyer or the dealer.[1] The benefits which flow from adequate warehousing may be seen in selection 192.

A. Transportation and Prices

179. FREIGHT COSTS AND MARKET VALUES[2]

By FRANK ANDREWS

It is well known that goods whose value is high in proportion to their weight are likely to be charged higher freight rates than goods of relatively low value. And it is of no little interest to note that this

[1] For a vigorous statement of the opposite view see *Quarterly Journal of Economics*, August, 1916, p. 805.

[2] Adapted from *Yearbook of the Department of Agriculture*, 1906, pp. 371–85.

rule of freight traffic applies even to the cost incurred by farmers in hauling their products from farms to shipping points. It is estimated that it costs an average of 16 cents per 100 pounds to haul cotton from farms to shipping points, while the cost for wheat is 9 cents. The average distance of cotton farms from local shipping points is 11.8 miles, the average weight of a wagonload of cotton is 1,702 pounds, and the average cost of hauling the load $2.76; the corresponding averages for wheat are 9.4 miles, 3,323 pounds, and $2.86. It is plain that cotton may be profitably hauled for greater distances and in smaller loads than wheat, since the value of an average load of the cotton picked in 1905 was more than $170, while a load of wheat was worth about $40.

The average railway freight rate for cotton from local shipping points to seaports is estimated at 40 cents per 100 pounds, while the corresponding rate for wheat is about 20 cents. This difference in railway charges between these two commodities illustrates the tendency of value to influence transportation costs, and also shows one of the several phases of the principle of railway-rate making which is often described as "charging what the traffic will bear." On the ocean, also, freight charges for cotton are higher than those for wheat. The rates quoted for regular lines of steamers for carrying cotton from Galveston, New Orleans, and New York to Liverpool averaged during the year ending June 30, 1906, about 32 cents per 100 pounds, while the corresponding rate for wheat was only one-fourth that sum, or 8 cents per 100 pounds. A cargo of cotton shipped from Galveston to Liverpool frequently contains as much as 5,500,000 pounds, and the value in 1905–6 of such a cargo at Galveston was not far from $600,000, while the same quantity of wheat would have been worth from $70,000 to $90,000.

Cotton.—The cost of hauling cotton from farms in the South Atlantic States was found to be 13 cents per 100 pounds, while the average for all the cotton regions west of Georgia and the Alleghany Mountains was 17 cents. The difference in cost between the two regions was due chiefly to the difference in the average distances from farms to shipping points, the distance for the South Atlantic States being 9.6 miles, and for the South Central States 12.7 miles.

Taking into account the relative quantity of cotton produced in the region affected by each rate, the average charge to Galveston from local stations in Texas, Indian Territory, and Oklahoma during 1905 was 54 cents per 100 pounds. The mean rate to New Orleans from

347 stations in Mississippi, Louisiana, and Tennessee was $1.14 per bale, or about 23 cents per 100 pounds. Cotton sent to Savannah from 738 stations in Georgia, South Carolina, Florida, and eastern Alabama was charged a mean rate of 41 cents per 100 pounds. Consignments of cotton to New York City from local stations in the cotton regions may be carried all the way in freight cars or may be sent down to some southern port and there transferred to one of the lines of coasting vessels for shipment northward. The mean rate per 100 pounds to New York from 298 local points in Mississippi, by railroad routes exclusively, was 48 cents, or 25 cents more than the rate to New Orleans as given above, and the mean rate to New York from 402 stations in North and South Carolina, Georgia, and eastern Alabama was 65 cents by all-rail routes and 59 cents by rail-and-water routes. These charges, it will be seen, are from 18 to 24 cents above the rates from practically the same regions to Savannah. The mean freight charge to New York from 700 local points among the cotton fields in Mississippi, North Carolina, South Carolina, Georgia, and eastern Alabama is taken as 54 cents per 100 pounds, the same as the estimated average rate from stations in Texas, Oklahoma, and Indian Territory down to Galveston. If the relative quantity of cotton exported from each port be taken into account, the average of the freight rates on cotton to Galveston, New Orleans, Savannah, and New York from local shipping points would be 40 cents per 100 pounds.

Ocean freight charges are subject to more frequent changes than are railroad rates. If the vessels at a certain port have a large amount of available space for cargo and the quantity of goods to be shipped is relatively small, freight rates are likely to be low. The mean of the published quotations for cotton to Liverpool for the first week of each month during the year 1905–6 was 33 cents per 100 pounds from New Orleans and 17 cents from New York. The rates from Galveston and other leading Gulf ports are regarded as practically the same as those from New Orleans.

The average ocean rate on cotton from the United States to Liverpool for the year 1905–6 was about 32 cents per 100 pounds, excluding terminal charges, the same as the annual mean of the quoted rates from Savannah to the United Kingdom. It will be noted also that the average railway rate from all local points to all ports, as estimated above, was 40 cents, while the charge from local points to Savannah was 41 cents per 100 pounds. In regard to both land and water rates Savannah occupies a medium position.

The sum of the cost per 100 pounds for transporting cotton on country roads, on United States railroads, and across the Atlantic, as estimated above, is 88 cents, and, with an allowance of 2 cents for transfer to ship at some United States ports, the entire cost of carrying may be taken as 90 cents per 100 pounds.

The mean price of cotton in England for the twelve months ending June 30, 1906, was about 12 cents per pound; the annual mean of the cash prices for Upland middling cotton at this market at the close of each business day for the year mentioned was 12.1 cents. The mean of the daily closing prices for Upland middling cotton at the four leading export cities of the United States for the same year was 11 cents. The difference in price between the four leading cotton ports of the United States and Liverpool was, therefore, 1.1 cents per pound, while the cost of carrying the cotton across the ocean was about one-third of 1 cent per pound, leaving two-thirds of 1 cent for profits and other items, such as insurance, selling commissions, and cartage. The total cost of transportation from United States farms to Liverpool, including cost of transfer to ships at United States ports, was about 7.5 per cent of the value of the cotton in that city. A summary of the transportation costs for cotton mentioned in the preceding paragraphs is given below:

From	Cents per 100 Pounds
Farms in 555 cotton-producing counties, by wagon, to local shipping points	16
200 local points in Texas, Indian Territory, and Oklahoma, by all-rail routes, to Galveston	54
347 local points in Mississippi, Louisiana, and Tennessee, by all-rail routes to New Orleans	23
738 local points in Georgia, South Carolina, Florida, and eastern Alabama, by all-rail routes, to Savannah	41
298 local points in Mississippi, by all-rail routes, to New York	48
402 local points in North Carolina, South Carolina, Georgia, and eastern Alabama	
By all-rail routes to New York	65
By rail-and-water routes to New York	59
Local shipping points to seaports, average for United States	40
Gulf ports and New York, by regular steamship lines, to Liverpool	32
Savannah, by chartered vessels, to the United Kingdom	32
United States to United Kingdom, average for all ports	32

Wheat.—The average farm value of wheat in the United States on December 1, 1905, was 74.8 cents per bushel, and the average cost

to the farmers of delivering this wheat at 9 cents per 100 pounds is 5.4 cents per bushel. Hence the actual value on the farm would be 69.4 cents per bushel. The mean of the railway freight rates on wheat from 562 local stations in Illinois and Nebraska to Chicago in 1905–6 was 16 cents per 100 pounds, the same as the mean rate to Minneapolis from 311 local stations in Minnesota, North Dakota, South Dakota, and Nebraska. To Kansas City, from 456 stations in Kansas, Missouri, and Oklahoma, the mean rate is found to be about 14 cents per 100 pounds. Making allowances for the relative quantities of wheat received at each of these three primary markets during the year 1905–6, the average rate on wheat from local shipping points to primary markets in 1905–6 was 15.5 cents per 100 pounds, which, added to the average cost of hauling wheat from farms in the North Central States, makes a total cost of transportation of 24.5 cents per 100 pounds, or 14.7 cents per bushel from farm to primary market.

The average of the prices for No. 2 red winter wheat at Chicago, No. 1 northern wheat at Minneapolis, and No. 2 hard wheat at Kansas City, allowing for the relative importance of each price in proportion to the quantity of wheat received at each market, is 85.1 cents per bushel, and the average farm value, including cost of hauling, of the crop in the states and territory named was 80.7 cents. The average freight rate being 9.3 cents, the average value on December 1, 1905, at the three primary markets for all marketable grades of the wheat of this region would be probably not more than 82 cents. This would make only 3.1 cents difference between the average value of all wheat and the price of three of the better grades.

From the interior wheat markets to the seaboard there are two general routes, one eastward to Atlantic ports and the other leading south to the Gulf of Mexico. Along the eastward routes the railroads have to share their traffic with the waterways formed by the Great Lakes and the connecting rivers and canals. The Mississippi River is a potential although not always an active competitor for the traffic from the wheat regions to New Orleans. During 1904 and 1905 practically no wheat was carried by river from St. Louis to New Orleans.

The freight charge from Chicago to New York or Boston for wheat intended for export was 15 cents per 100 pounds in 1905–6, by all-rail routes. The lake-and-rail rate from Chicago to New York ranged between 5.75 and 7.50 cents per bushel. Shipments by way

of the lakes and Erie Canal were sent at still lower rates. During the calendar year 1905 the mean rate by lake and canal to New York from Chicago was 5.53 cents per bushel, by lake and rail the rate was 6.40 cents, and the railroads charged 9.90 cents for carrying the wheat the entire distance. The all-rail rate from Chicago to Baltimore and Norfolk was 3 cents per 100 pounds less than the rate to New York or Boston and 1 cent below the charge to Philadelphia, on exported wheat. The mean all-rail rate on exported wheat from Chicago to the Atlantic seaboard may be taken as about 13 cents per 100 pounds, or 7.8 cents per bushel. On wheat intended for domestic consumption the rate to Boston from Chicago was 4.5 cents per 100 pounds above the export rate, and the mean rate on domestic wheat from Chicago to Boston, New York, Philadelphia, Baltimore, and Norfolk exceeded the mean export rate by 3 cents per 100 pounds, or 1.8 cents per bushel.

The average rate on wheat from local points in the interior to the Atlantic and Gulf coasts is less than the sum of the charge from those points to primary markets plus the charge from these markets to the seaboard. The mean rate from local stations in the wheat region east of the Rocky Mountains to the Atlantic seaboard is taken as 13.4 cents per bushel, which is the mean rate from Kansas City and Omaha to that coast, and the rate to the Gulf as 10.8 cents, the same as from Kansas City to New Orleans and Galveston. The average rate from local shipping points to both coasts, allowing for the relative quantity of wheat exported from each, would be 12.6 cents per bushel.

Ocean rates were higher than usual during the year 1905–6, and the mean charge for carrying wheat by regular steamship lines to Liverpool from New York, a distance of about 3,100 miles, was 3.8 cents per bushel, or 1.6 cents less than it cost a farmer to haul the wheat 9.4 miles from his farm to a neighboring railroad station. Sometimes the rate on wheat from an Atlantic port in the United States to Liverpool is as low as 1.5 cents per bushel, or 3.9 cents less than the average cost of hauling from the farms. The average of the rates on wheat to Liverpool by regular lines from New Orleans and New York and by chartered vessels from Baltimore, not including costs of transfer, may be taken as 4.8 cents per bushel, or 0.6 cent less than the cost of hauling in wagons from farms to shipping points.

The mean price at Liverpool for "No. 2 red winter" wheat for five months ending June 30, 1906, the season when this grade was most frequently quoted there, was 92.6 cents per bushel, and the

cost of transportation to Liverpool from local points in the Middle West is estimated at 17.4 cents per bushel. Deducting this freight charge from the price just quoted, and allowing 1.5 cents for profits and minor costs, the value of this quality of wheat at local shipping points in Illinois, Minnesota, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma would be 73.7 cents, or only 2.9 cents per bushel above the average value of all wheat at those points.

The value of wheat sent to Liverpool in 1905–6 and the freight costs along the way, expressed in averages applying to the United States as a whole, were:

	Cents per Bushel
Value on farms in United States before hauling	69.4
Cost of hauling to local shipping points	5.4
Average farm value, including cost of hauling	74.8
Railway freight charges from local points to seaport	11.6
Ocean freight charges to United Kingdom	9.6
Minor costs of sale and shipment	1.5
	97.5

In the United Kingdom, where a large part of the wheat consumed is imported, the cost of ocean transportation is an important matter. During the calendar year 1905 the wheat, not including flour, imported into that country amounted to 182,000,000 bushels and the average cost of ocean freight was about 9 cents per bushel, thus making the total cost of carrying it on sea more than $16,000,000. The mean annual rates on wheat from the various exporting regions to the United Kingdom for 1905 are as follows:

From	Cents per Bushel
Canada	4
United States, Atlantic and Gulf ports	5
Russia, Black Sea ports	7
Roumania	7
British India	9
Argentina	11
Australia	14
United States, Pacific ports	17
Average	9

The effect of applying to wheat the same rates as are charged some other articles in ocean traffic would be alarming to the British

people and to all other nations which receive an important part of their wheat supply from over the sea; and the readjustment of prices brought about by such changes in transportation costs might have serious results for the agricultural interests in many countries of supply. If the average cost of carrying cotton the 3,000 or 4,000 miles from United States Atlantic and Gulf coasts to the United Kingdom were applied to transportation of wheat over the routes mentioned above, ranging in length from 3,000 to 15,000 miles, the rate per bushel would be 19 cents instead of 9, and the margin between prices in England and in countries of supply would average 10 cents per bushel more than in 1905.

180. TRANSPORTATION RATES AND CANTALOUPE PRICES[1]

By WELLS A. SHERMAN[2]

The daily receipts of car lots of cantaloupes naturally play an important part in determining prices. On the average large market, these receipts are from several widely separated producing sections. Cantaloupes from California were on the New York market with those from Maryland; a section distant more than 3,000 miles competing with a shipping area only some 200 miles away. On August 15, Texas points, 2,100 to 2,200 miles distant from New York City, were sending their melons to compete with those from New Jersey. New Mexico and Nevada compete with Indiana and Illinois for preference on the Chicago market. A good example of the competition between different producing areas is shown by the conditions on August 15 in the city of Chicago, when the melons from eight different states were quoted as being in direct competition with each other. It is interesting to note the wide area represented with Michigan in the North, Texas in the Southwest, California in the West, and Delaware and Maryland in the East.

There are important reasons why competition from such widely separated areas is possible. Transportation and refrigeration facilities are such that it is now possible to deliver these shipments from distant points to eastern markets in practically as sound condition as that in which local supplies arrive. The question of competition narrows itself to a comparison of appearance and quality of the melons and the difference in freight and refrigeration rates from these competing

[1] Adapted from *Bulletin 315, United States Department of Agriculture*, pp. 3–6.

[2] A. Dexter Gail, Jr., and Faith L. Yeaw, collaborators.

TABLE II

CAR-LOT FREIGHT AND REFRIGERATION RATES ON CANTALOUPES IN EFFECT DURING THE SPRING OF 1915
(These rates are subject to change on legal notice)

To	From: Brawley, El Centro, and Imperial, Cal. — Freight Service: Freight per 100 Pounds	Brawley, El Centro, and Imperial, Cal. — Freight Service: Refrigeration per Car	Brawley, El Centro, and Imperial, Cal. — Express Service: Express per 100 Pounds	Brawley, El Centro, and Imperial, Cal. — Express Service: Refrigeration per Car	Las Cruces, N.M. — Freight Service: Freight per 100 Pounds	Las Cruces, N.M. — Freight Service: Refrigeration per Car	Las Cruces, N.M. — Express Service: Express per 100 Pounds	Las Cruces, N.M. — Express Service: Refrigeration per Car	Rocky Ford and Las Animas, Colo. — Freight Service: Freight per 100 Pounds	Rocky Ford and Las Animas, Colo. — Freight Service: Refrigeration per Car	Rocky Ford and Las Animas, Colo. — Express Service: Express per 100 Pounds	Rocky Ford and Las Animas, Colo. — Express Service: Refrigeration per Car	Seaford, Del. — Freight Service: Freight per 100 Pounds	Seaford, Del. — Freight Service: Refrigeration per Package	Seaford, Del. — Express Service: Express per 100 Pounds	Seaford, Del. — Express Service: Refrigeration *
Albany, N.Y.	$1.25	$112.50	$2.50	$105.00	$0.985	$72.50	†	†	$0.795	$65.00	†	†	$0.249	$0.11	$1.20	
Baltimore, Md.	1.25	112.50	2.50	105.00	.97	72.50	$1.75	$75.00	.78	65.00	$1.375	50.00	.189	.095	.64	
Boston, Mass.	1.25	117.50	2.75	110.00	1.04	75.00	2.00	75.00	.85	65.00	1.625	50.00	.315	.11	1.28	
Buffalo, N.Y.	1.15	107.50	2.50	105.00	.86	65.00	1.75	75.00	.635	60.00	1.25	45.00	.261	.11	1.35	
Chicago, Ill.	1.00	97.50	2.25	90.00	.65	†.60	1.25	55.00	.46	50.00	1.00	37.00	.368	.125	1.84	
Cleveland, Ohio	1.15	107.50	2.50	100.00	.83	65.00	1.75	70.00	.605	60.00	1.25	45.00	.261	.125	1.43	
New York City, N.Y.	1.25	112.50	2.50	105.00	1.00	72.50	1.75	75.00	.81	65.00	‡1.375	‡50.00	.21	.095	.94	
Philadelphia, Pa.	1.25	112.50	2.50	105.00	.98	72.50	1.75	75.00	.79	65.00	1.375	50.00	.189	.095	.64	
Pittsburgh, Pa.	1.15	107.50	2.50	100.00	.86	65.00	1.75	70.00	.635	60.00	1.375	50.00	.221	.11	1.20	
Rochester, N.Y.	1.25	112.50	2.50	105.00	.91	72.00	†	†	.72	65.00	†	†	.249	.11	1.35	
St. Louis, Mo.	1.00	97.50	2.25	85.00	.65	†.60	1.25	55.00	.41	50.00	.875	35.00	.431	.14	1.99	
Washington, D.C.	1.25	112.50	2.50	105.00	.97	72.50	1.75	75.00	.78	65.00	1.375	50.00	.221	.095	.90	

* Express company does not provide refrigerator service. If any is desired the express company will supply refrigerator cars for quantities in excess of 12,000 pounds, but shippers must furnish the ice.

† No carload rates in effect.

‡ Delivery at Jersey City only.

areas. If the melons from California and Texas are not superior in some way to those from Delaware, Maryland, and Michigan, then they cannot profitably enter the same market, unless the cost of production is sufficiently low to offset the increased freight and refrigeration charges.

A close study of the larger markets leaves no doubt that in a general way higher prices are paid for cantaloupes grown under irrigation than for those grown under rainfall. While the latter may be of equal quality at times, the quality varies more from week to week with changes in temperature, rainfall, and sunshine at the point of origin. If irrigation is controlled properly, the western cantaloupes never lie on wet ground, and are almost entirely free from the unattractive white side which characterizes most of those grown under rainfall, especially in very wet seasons.

Table II gives the car-lot rates for freight and refrigeration from several well-known cantaloupe shipping sections to 12 of the large markets in the East and Middle West.

In the immediate vicinity of many important markets a large acreage of cantaloupes is planted annually. These cantaloupes can be placed on the home market at a minimum of expense as there are no heavy freight and refrigeration charges to pay and in some cases the packages are returned to the grower. The saving in transportation charges is considerable, as indicated in Table II. In addition to this, the local growers have the great advantage of being able to offer dealers a daily supply of freshly picked melons. In many cases, in 1914, it was possible to dispose profitably of a local crop at prices which would not return the distant car-lot shipper his cost of transportation.

181. ENLARGING THE ZONE OF THE CITY'S MILK SUPPLY[1]

By EUGENE MERRITT

In 1842, when the Erie Railroad was under construction, one of the New York City milkmen began to ship milk from Orange County. This milk proved to be of such good quality that the traffic spread rapidly. In a few years the Harlem division of the New York Central began to haul milk from the counties on the west bank of the Hudson River. At the same time the Newburgh, Dutchess, and Connecticut branch of the Central New England was shipping milk to New York

[1] Adapted from *Bulletin 177, United States Department of Agriculture*, pp. 10–14.

City over the Hudson River branch of the New York Central. A few years later the New York, New Haven & Hartford was bringing milk from the New England States to supply the New York market. In 1870 the Delaware, Lackawanna & Western received small consignments of milk on its Sussex branch in New Jersey, and in the same year the New York, Ontario & Western started its first milk train from Bloomingburg, New York. Practically all of the railroads had their farthest point from New York within the 100-mile limit, except that the Harlem was bringing milk from Rutland, Vermont, a distance of 240 miles. There was very little change in the areas from which milk was obtained until 1890. In that year the New York, Ontario & Western extended its service to Walton, New York, a distance of 179 miles. Shortly after 1890 several other railroads started milk trains. The Lehigh Valley established this service with Dryden, New York, as a terminus. In 1893 the Delaware & Hudson was receiving milk and forwarding it to New York City over the Delaware, Lackawanna & Western. In 1890 the West Shore extended its service beyond Albany, with Syracuse as a starting-point, and two years later the Hudson River branch of the New York Central extended its service to the same point. By 1910 many of the points from which milk was shipped to New York City were over 300 miles distant. There were no new railroads to enter this service, but those already carrying milk had extended their lines so that it was bounded by the Canadian boundary line on the north and within a short distance of Buffalo on the west.

Prior to 1870 all of the milk consumed in Boston came from a distance of not more than 65 miles. By 1910 this had been extended to 210 miles, thus tapping regions from which milk is shipped to New York City also. Philadelphia, likewise, has been enabled by railroad shipping facilities to draw its milk supply from as far west and north as New York state within a few miles of Buffalo.

B. Improving Methods of Handling Farm Products

182. THE LOSS DUE TO BAD METHODS OF HANDLING EGGS[1]

By M. E. PENNINGTON and H. C. PIERCE

Let us see what sorts of eggs are found in our markets. Here are rotten eggs, broken eggs, cracked eggs, dirty eggs, and stale, shrunken eggs, and last--unfortunately many times least also—are the frefh,

[1] Adapted from *Yearbook of the Department of Agriculture*, 1910, pp. 463–76.

sound, clean eggs, which the market calls "firsts." What causes contribute to this list of undesirable and loss-producing grades? Three causes mainly: (1) climatic conditions, (2) careless or deliberately bad marketing, (3) poor care of the poultry on the farm. The egg must be kept cool at every stage of its handling if it is to retain a maximum of freshness when it reaches the consumer. This is not a simple matter, even when one considers the great progress made in the extension of artificial refrigeration throughout the country. Refrigeration in cars and warehouses, chilled rooms at the commission man's, and the retailer's icebox are, with fair rapidity, making possible a system of handling that will surmount temperature difficulties, provided the eggs are delivered to the first refrigerator in good condition. No amount of refrigeration or care will undo the damage done by a few hours of summer sun or a few days in a hot room. Indeed, after deterioration has begun, refrigeration is unable to check those processes completely.

The first responsibility for low quality of market eggs is found to rest upon the farmer, and after him come the country produce dealer or storekeeper and the shipper who does not have artificial refrigeration. Usually the farmer gathers his eggs daily, or he may gather them at irregular intervals. Stolen nests often accumulate a large lay, over a period of some weeks, and may have been covered by brooding hens for a while, to boot, before the farmer happens to find them; but the chances are that every sound-shelled egg goes to market, regardless of the condition inside the shell. If the eggs are gathered with fair regularity, how are they kept while on the farm? Generally where the housewife can most conveniently get them for household use, not where the temperature is low and the air fresh. Neither does the farmer have any regular time for taking this stock of eggs to market. In the spring, when they are most plentiful and the market is falling, he is apt to go weekly or the egg peddler calls at the farm. When hot weather comes and the lay falls off he waits for a larger number or is too busy with "crops" to drive to town. Meanwhile shrinking and incubation are going on rapidly, and, as a last insult to the hen which laid a perfectly fresh egg, he often goes to the market with an umbrella over himself, but the basket or box of eggs is exposed to the summer sun, a heat which is often 110 degrees Fahrenheit and may be 10 degrees above that. In the autumn, with a still smaller lay and a rising market, he holds eggs for high winter prices. The conditions under which he keeps them are not conducive

to good preservation, and the time is inordinately long. Is it any wonder, with such conditions prevalent on the farm, that studies made in one of the typical western egg-producing states during the candling season showed the following losses on delivery to the packer?

PERCENTAGE OF EGGS CONSTITUTING A TOTAL LOSS AT PACKING HOUSE

Month	No. of Shippers	Percentage of Rots or Other Total Loss	No. of Dozens Examined
June, two weeks	12	3.10	5,430
July	19	2.79	13,740
August	16	3.43	9,270
September	9	4.03	2,970
October	5	4.47	1,110
November	2	8.33	210
Mean		4.36	
Total			32,730

The figures in this table give only those eggs which are a total loss. No mention has been made of the stale eggs, dirty eggs, blood rings, and other sources of partial loss. Note that the greatest number of eggs totally lost is in November, when prices to the farmer are very high. In further confirmation of this fact are some investigations of the quality of eggs brought to the country storekeepers during October, showing that only 25 per cent would rank as "first" on the Chicago markets, 60 per cent were "seconds," owing to long holding, 5 per cent were cracked, and 4 per cent were rotten or stuck to the shell from long holding. Some of the farmers at this time had held eggs for four weeks.

The country merchant handles eggs as a by-product, taking them in exchange for merchandise. He makes his profit on the merchandise taken in trade, not on the eggs, frequently giving an inflated price for them to hold the trade of the desired customer. He, too, is more apt to be careless than careful of them while they are in his possession, storing them in hot or damp quarters and holding them for high prices when production is low.

The country merchant and peddler buy eggs "case count," rather than "loss off." Buying "case count" means that a uniform price is paid per dozen, irrespective of the quality of the eggs. Rots bring just as much as good eggs. Buying "loss off" means that the eggs are candled before payment is made and rotten and broken eggs

returned to the farmer. Occasionally a difference is made between first and second quality eggs.

The farmer usually delivers the eggs to the storekeeper or packer's agent by wagon. From these receivers they commonly go to a central shipping plant, which is generally known as a "packing house," and which handles goods in car lots. This plant may or may not be provided with the proper facilities for doing the work assigned it. To get to the packer, however, the eggs generally go by train and in comparatively small quantities, therefore, as "less than car lots," or what is known to the railroad men as "l.c.l.'s." For such small lots or for short hauls the goods are picked up by a local freight. The wait at the station, which is frequently only an open platform on which the cases remain until the arrival of the train, is ruinous to quality when the weather is warm.

The haul in the "pick up" freight car, the temperature of which is governed entirely by atmospheric conditions, results in rapid deterioration in summer and oftentimes freezing in winter.

The progressive packer, who generally handles poultry, eggs, and butter, is now equipped with an artificially refrigerated chillroom which maintains a temperature of 40 degrees or a little less. If he is wise he rushes the eggs in cases into that room, stacks them loosely, and chills thoroughly before shipping to his own market center. He also candles in a room which is chilled, removing rotten eggs and broken eggs and grading according to cleanliness, size, and, to a certain extent, freshness. After the packer has graded and repacked the eggs in boxes holding 30 dozen each, with clean "fillers"—as the little strawboard racks which hold the eggs are called—he ships them to the market center, generally in car lots. This gives him a chance to control the temperature of the car, keeping it iced in summer or closing it to prevent freezing if the weather in transit happens to be cold.

It is not a difficult matter for the transportation systems to keep egg cars cool enough in summer to insure quality, provided the eggs are good when they are put aboard the car. But breakage during the transit is a serious matter. Freight cars are shunted from siding to siding; air brakes come down hard and the long train jars from engine to caboose, and flying switches may occur while the cars are moving rapidly. These are hard knocks for an eggshell to withstand. Various devices have been and are constantly being tried by the railroads to prevent the shifting of loads, but the breakage of eggs in

transit is still discouragingly high to the shipper who loses stock, the railroads which pay claims, and the consumer who ultimately foots the bill for both.

It costs just the same amount to collect, pack, ship, grade, and market a stale, dirty, or otherwise low-quality egg as it costs to perform a like service for a high-grade egg, though the former must sell for a lower price, and the five millions of rotten eggs that get to New York in a year represent just as much of an outlay of money as is expended on the five million dozens of good eggs. The wholesaler, who weeds out the rotten eggs, spreads the loss over the rest of the eggs in the lot, and the price to the retailer goes up accordingly. Then the retailer increases his price to the consumer, and the consumer being the last on the list, pays the price and wonders why the cost of living has increased.

What can we do to prevent egg deterioration all along the line, and thereby give the consumer a better product and increase its value to the industry?

First, the farmer must learn to select good breeds of chickens and take more care of them, that eggs may be larger, cleaner, and more plentiful on the farm. He should also kill off all the mature cocks as soon as the brooding season is over. The education of which the farmer is in need in the gathering and care of eggs after they are laid, and the prompt delivery of them to the next person in the marketing chain, is self-evident from the recital of the farmer's present methods.

The country storekeepers and small produce buyers are, next to the farmer, responsible for the number of low-grade eggs marketed. They must be taught to buy "loss off" instead of "case count." Buying "case count" places the good farmer and the poor farmer on the same basis, and is grossly unfair to the good farmer. The producer of good eggs receives less and the producer of bad eggs more than they are worth. What incentive is there, on this basis, for the farmer to take extra trouble and care?

Another bad habit which is gaining in the countryside is the leaving at the farm by the packer or merchant of carriers holding 30 dozen. The farmer waits until the case is full before marketing. This is not objectionable when the flock is large or production rapid, but out of season or on the small place it means three or four weeks' holding to get a full 30-dozen box. The shipper can materially improve the quality of eggs in the market if he buy by quality—not simply by count. He will also improve his business.

The packer, too, must have artificially refrigerated rooms for handling and holding eggs. Indeed, it seems likely that, as the egg and poultry industry develops, and we must give more attention to the saving of the garnered foodstuffs, there will be numerous receiving stations throughout the country, easy of access and artificially refrigerated, that perishable products in general may be economically handled at the source of production.

The source of production.—There is the starting-point for most of the trouble in the handling of perishable produce, be it southern cotton mishandled in the field before it is baled, or western corn that is not well dried before it goes to the elevator, or eggs that are heated or soiled or cracked on the farm. Not all the trouble is at the starting-place, of course. Good handling must be everywhere from the producer to the consumer if the maximum of quality and minimum of loss are to be maintained. But even perfection of handling at the market center cannot compensate for bad treatment at the source of supply.

183. THE INFLUENCE OF REFRIGERATED CARS AND STEAMBOATS ON THE FRUIT INDUSTRY[1]

By WILLIAM A. TAYLOR

The rapid development of commercial fruit culture has been one of the remarkable features of the agricultural progress of the world in the century just closed. From the position of an insignificant industry at the beginning of the century it has risen to commanding importance in many countries, and in some has become the dominant feature of agriculture. Outside of the wine-producing regions of the Old World there was comparatively little commercial fruit culture a hundred years ago except in specially favored localities and for the supply of local needs. In a few localities there was a considerable production of fruit for sun drying, as in the prune districts of France and the raisin districts of Spain and other Mediterranean countries. Oranges and lemons were marketed to some extent from Sicily and Spain in the ports of Western Europe, and occasional small lots found their way across the Atlantic to the seaboard cities of America, but without sufficient regularity to develop more than a speculative and haphazard trade in fruits. It seems hardly possible that no longer ago than 1871 there were but a half-dozen fruiterers in London, now

[1] Adapted from *Yearbook of the Department of Agriculture*, 1900, pp. 561–78.

the greatest fruit market in the world, and that oranges and lemons at that time constituted almost their sole stock in trade, aside from home-grown fruits in their season. Yet this is asserted by one of the veteran dealers of the city to have been the case when he began business in that year.

Soil and climatic conditions were the same then as now, and regions in the Old World to which the more important fruits were adapted were fairly well defined; choice varieties had been developed also, including many of those that are now the leaders in our markets. The one thing lacking was rapid and regular transportation. As steam was applied to navigation and to railroading during the second third of the century, orchards and vineyards expanded. Under the influence of improved shipping facilities on both sea and land, the market broadened rapidly and the fruit trade gradually took on definite form, and was recognized as a legitimate branch of commerce.

As railroads penetrated the interior of America and Australia, new and fertile regions, blessed with a genial climate, became accessible, and the areas devoted to fruit culture rapidly increased. The story of its development in California, after American occupation, is too familiar to need repetition, and is perhaps the most conspicuous example of the rapid development of a horticultural industry in the history of the world.

This activity, though more noticeable in the newer continents, was by no means confined to them, marked development of orchard interests having occurred during the same period in England, and in France, Spain, Italy, and other Mediterranean countries. More recently this development extended to Tasmania, New Zealand, and South Africa.

The stimulus to planting afforded by the improved facilities for transportation, however, soon resulted in disastrous effects of overproduction in some sections. Large orchards, vineyards, and small-fruit plantations were planted farther from their prospective markets than their products could be transported. This was notably true in the Southern United States, where the added incentive of high prices for early fruits in markets farther north caused large plantings of the more perishable fruits, such as strawberries, blackberries, raspberries, peaches, and plums. The planters demonstrated that they could produce these fruits in large quantity and of high quality at a relatively low price, but the product could not, with the then existing facilities, be delivered to the distant consumer, for whom it was

intended, in sound and wholesome condition. Thus, the truckers near Norfolk, Virginia, demonstrated as early as 1860 that the strawberry could be grown in large quantities and ripened long in advance of the northern crop. But, as repeated shipments spoiled in transit, its culture was abandoned until the development of more durable varieties and improved transportation brought the New York market within reach of the growers. The early peach industry of South Carolina and Georgia suffered a similar experience about 1850–70, and practically ceased to exist for a period of fifteen to twenty years; then suddenly, with the origination of a variety (Alberta) better adapted to long shipment, and the development of a car service adequate for fruit transportation, that region sprang into a leading place among the peach-producing sections of the country.

The great bulk of rail shipments in the early days went to the market in freight cars, but it was soon found that serious losses from deterioration in transit were too frequent and too large to leave a profit to the shipper. Ventilated cars of various kinds were tried with varying success, the first carload shipments of deciduous fresh fruits from California, consisting of 33 tons of pears, apples, grapes, and plums, having been successfully made in them in 1869. All shipments from California prior to 1888 were thus made, carefully selected foothill fruit enduring the journey to Chicago, or even farther east, where the trains were moved on express schedule. Valley fruits and those from irrigated lands, however, could not be safely shipped.

The results were quite uncertain, and the outlook discouraging until about 1887, when F. A. Thomas, of Chicago, entered the field with Mr. Earle and revolutionized the business of fruit transportation. His plan was to provide a through service from shipping point to destination in special cars under one management, re-icing the cars in transit as found necessary. It was, in short, the establishment of a private car line for fruit transportation, to be operated on a plan similar to that under which sleeping cars had long been run in the passenger service. He commenced operations with a few cars in western Tennessee in the spring of 1887, operating first on strawberries destined for the Chicago markets. Owing to the distrust of shippers in regard to the effect of ice upon the fruit he was compelled to buy fruit with which to fill them for shipment. A few tests demonstrated the practicality of the system, however, and the new service became popular.

Development after that was rapid. From a total of sixty cars in service in 1888, the company which Mr. Thomas organized increased its facilities, until by 1891 it had in use over six hundred cars. These traveled over various railroads as needed, being used for Florida fruit in winter and Louisiana and Mississippi strawberries in spring, gradually working out northward as the season progressed, with long trips out to the Pacific Coast in July, August, and September. Their usefulness did not cease with the approach of winter, for they protected their contents against a considerable degree of cold, and when heated could safely be used in severe cold weather.

The larger plantings, stimulated by the refrigerator-car service, soon made possible the loading of cars at a single shipping point or at a few along the line of road, so that small growers now have the same advantage as large shippers except in the matter of car-lot rates.

In recent years the business of operating cars has been taken up by many lines, so that there are now probably fifty or more different private car lines in service of various kinds, in addition to similar cars operated by many of the railroads that traverse fruit-producing regions. The fruit is in many sections loaded from the packing house, where it is protected from the heat of the sun, directly into the cold refrigerator car, from which it is not removed until it reaches its destination, 1,000, 2,000, or 3,000 miles away. From the important fruit sections these cars are moved in solid trains to the principal markets. Capacious icing stations established at intervals along the main routes of travel permit re-icing of the cars with the utmost dispatch.

Official statistics of the number of refrigerator cars in service are lacking, owing to the failure of some of the car lines to report the number of cars owned and operated by them. A careful estimate by the manager of the *Railway Equipment Register* in March, 1901, indicates that there were at that time about sixty thousand cars in service in the United States, Canada, and Mexico.

No basis exists for estimating the total volume of produce handled by these cars, but it is very large. Leading shippers estimate that 95 per cent of the California deciduous fresh fruits are now handled in them, and the proportion from other sections is steadily growing. Small-fruit and orchard areas in the more remote regions adapted to fruit culture are steadily growing under the influence of this service, and the producers are enabled profitably to diversify their production as never before.

As would be expected, the early efforts in fruit refrigeration on the ocean were made in connection with the export trade in ice from the New England states early in the last century. This trade carried American apples literally "on ice," first to the West Indies, later to the more important tropical maritime cities of the globe, including those of India, China, and Australia. It never attained large proportions, however, owing to the excessive prices at which fruit thus transported must be sold to yield profit to the shipper.

Shipments of fruit in mechanical refrigeration on steamers do not appear to have been made until after the Australian meat trade, which began in 1880, was well established.

The trade is yet limited to apples, pears, oranges, though some shipments of grapes have gone through in sound condition. In this connection it should be noted that in 1893, at the Columbian Exposition at Chicago, the New South Wales exhibit contained a collection of ten varieties of apples, together with oranges and lemons, forwarded to Chicago in two lots, one via San Francisco, which was fifty-two days in transit, and the other via New York, which was several days longer. These exhibits demonstrated in a manner most convincing the usefulness and the possibilities of refrigeration in fruit forwarding as developed in Australia.

In the spring of 1892 experimental carload lots of tomatoes from Florida were shipped to England. Later in the season five shipments of California peaches, pears, and plums, aggregating twenty-four carloads of 20,000 pounds each, were forwarded to Liverpool from New York. These shipments were made in refrigerated compartments containing four or five carloads each, the latter quantity being required to fill a compartment. The departure of the fruit from California was timed to correspond with the sailing date of the ship for which it was destined, and the total time from shipping point to Liverpool and London was seventeen to eighteen days. The gross sales of the twenty-four carloads amounted to about $32,000, but the heavy expense of forwarding by this method left no profit to the shippers. With a good deal of fluctuation, these export shipments of summer fruits have continued from year to year, however, and they show a gradual growth. Longer experience in handling has made it possible to deliver peaches, pears, and plums from California in London in sound condition, almost without failure. The uncertain question from the commercial standpoint now is the condition of the market on arrival. If bare of English and French fruits, prices sufficiently high

to leave a profit are obtained, otherwise not. With lower ocean transportation and refrigeration rates a considerable increase could be made with profit, as the fruit can now be placed on the London market within fifteen to seventeen days from the tree in California.

184. LOWERING THE COST OF TEAM HAULING[1]

By FRANK ANDREWS

An inquiry just completed by the Bureau of Crop Estimates shows an average distance from market of 6.5 miles for the farms of the United States, while those farthest away from market (excluding of course the rarer instances) average 8.7 miles. It requires about one-half day for the average farmer to make a round trip with wagon from farm to market and back, and averages nearly two-thirds of a day for the farmers who are farthest from market. The figures by states show that the longer hauls are generally in the cotton states and in the Rocky Mountain region.

In 1906 a similar investigation was made. Those figures are not strictly comparable with those for 1915, but it is evident that wagon hauls are shorter than they were nine years ago. In 1906 the average haul from farm to shipping point was, for wheat, 9.4 miles; corn, 7.4; oats, 7.3; potatoes, 8.2; and cotton, 11.8 miles; each of these staple crops was hauled a longer distance in 1906 than the general average haul in 1915 (6.5 miles). It is noted also that the average number of round trips per day for all farm-to-market hauls was 2.1 in 1915. In 1906 the average number of round trips per day for hauling wheat was 1.2; for corn, 1.7; and for cotton, 1.0.

Railroad building during the past nine years has brought some farms nearer to shipping points and markets, and has helped to shorten the average distance hauled and to increase the average number of trips per day. During the seven years following 1906 more than 32,000 miles of new railroad were built, and several thousand more miles have been added since 1913, so that there are at least 15 per cent more miles of steam railroads in the United States now than in 1906. In addition to this new mileage of steam railroads, the hauls of some farmers have no doubt been shortened by new freight-carrying electric railroads.

The time required in hauling is an element in the cost of producing and marketing crops. From the farmer's point of view it is an element

[1] Adapted from "The Agricultural Outlook, April 23, 1915," *Farmers' Bulletin 672*, pp. 11–13.

in the cost of production. The improvement of wagon roads during the past nine years has probably helped to increase the average quantity of farm products moved by a day's wagon haul, and so to reduce the cost of hauling.[1] Such reduction in the cost of hauling constitutes a direct economic or money advantage, which follows the improvement of public roads in every community. Besides this direct advantage, certain dependent or reflex advantages also arise in a community where roads have been improved. The increase in the value of farm lands is an example of such indirect advantages. Of course the direct decrease in the cost of hauling and the increase in farm values are not entirely separate and independent. The farm increases in value partly because the cost of hauling is decreased.

Whatever methods are used to improve a road, the improvement for hauling purposes is due to three causes—the betterment of the road surface, the reduction of the grade, and the shortening of the length. On such an improved road the time required to haul a given quantity of material a given distance is reduced. The reduction may be largely due to increased speed of hauling, to increased load, or to both. It is important to recognize that for transportation purposes reduction of time is equivalent to a decrease of the distance from the market centers. It is easy to see, then, why the increase of farm values must follow improved roads, for their effect is to bring the farms, in a sense, nearer the towns. The fact that on roads with improved surfaces hauling becomes largely independent of the season of the year or weather conditions means another very considerable reduction in hauling costs.[2] It also means that many of the limitations of the number and kind of farm operations are immediately removed.

In order to fix one's ideas on the reduction in the cost of hauling due to the improvement of roads, the transportation of goods to the railroads and of farm produce to market should be considered. The cost of this work in the United States at present is high and is due mainly to steep grades and yielding road surfaces on unimproved

[1] The remainder of this reading is adapted from *Farmers' Bulletin 505*, pp. 3–10.

[2] This point might well be elaborated. If the roads are usable at all times, the farmer can often do hauling when his time and that of his team would otherwise be wasted. Likewise, he can deliver his goods to market at just the time when demand is strong and prices good. We talk much of the advantage the farmer would gain by storing on the farm instead of dumping his goods on the market as soon as harvested. But if the character of the roads is such that he must do his hauling before the rains begin in the fall or before the frost begins to come out of the ground in the spring, these benefits are out of his reach.—EDITOR.

roads. When a grade exceeds a rise of 6 feet to the hundred feet in horizontal measure it becomes an increasing hindrance to traffic. It must always be remembered that the worst grade on any road tends to limit the load that can pass over the *entire* road.

The cost of hauling farm produce to market is probably not so much increased by the presence of excessive grades as it is by the bad conditions of road surfaces. The desirable road surface is hard and reasonably smooth. Almost every road is fairly hard at certain times in the year. Too frequently, however, at the season when it is desired to use the roads, the surface is soft, and the consequent tractive resistance is excessive and wasteful. The most frequent form of soft road surface is the muddy surface. Many attempts have been made to fix the relative weights which a horse can draw in an ordinary wagon over level road surfaces of various kinds, and the following figures are current and fairly reliable: On a muddy earth road the amount varies from nothing to a maximum of 800 pounds; on a smooth, dry earth road, from 1,000 to 2,000 pounds; on a gravel road in bad condition, from 1,000 to 1,600 pounds; on a gravel road in good condition, about 3,300 pounds; on a macadam road, from 2,000 to 5,000 pounds; and on a brick road, from 5,000 to 8,000 pounds. These figures show that if the speed of travel is the same on all these road surfaces a horse will haul on a good macadam road from three to five times as many tons per mile in a day as upon a moderately muddy earth road. This matter may be considered in another way by admitting that one horse is capable of a certain fixed duty per day. Then, with a given load, the effective radius of travel from a given point on a macadam road is from three to five times the radius of travel from that point on a moderately muddy earth road. The trouble with unimproved earth roads is that they are moderately muddy for many months in the year.

C. Railway Equipment and Services

185. METHODS OF HANDLING SHIPMENTS OF FRUIT AND VEGETABLES[1]

By FRANK ANDREWS

Progress in methods of hauling perishable fruits and vegetables is part of a general betterment of railroad service. The freight carried on many railroads is divided into classes, based upon the kind

[1] Adapted from *Yearbook of the Department of Agriculture*, 1911, pp. 167–75.

of service rendered. The highest class of goods is given the quickest and most regular service. A second class of goods, and even a third or a fourth, may also be moved in trains having regular times for arrival and departure, but which are slower than the "manifest," "red ball," or "vegetable express" trains. These classes are distinct from the classes upon which freight rates are based.

Fresh fruits and vegetables are usually included in the list of commodities which are given this best service. Trains carrying these perishable products are run at greater rates of speed and with greater regularity than are ordinary freight trains. Delays are reduced to a minimum, and especial care is taken to have the cars carrying these fruits and vegetables move promptly along the way. Where the traffic justifies it, entire trains are made up of such produce.

One feature of this service is the telegraphic report which is made of each car as it passes each reporting station on its route. These "passing" reports, however, are made, on some railroads, for lower classes of freight also.

Some of the principal parts of this system were in use before 1885 on at least one railroad. Cars were reported by telegraph on passing certain points, and their movement was recorded in the central office, not only in writing but by means of pegs. Each car was represented by a peg bearing the symbol of the car and inserted in a block which represented the train. The route over which the cars moved was represented by a board on which vertical lines and spaces indicated the various stations from which "passing" reports were made. When a train was reported to have passed a station, the block representing the train was moved past the place on the board that represented the station. The telegraphic report mentioned each car in the train; cars not so mentioned were accounted for, with the reason for delay, or were the subject of prompt inquiry from the central office. This system is now in use on a number of railroads. The information shown on the board is kept also in written form, and, on some railroads, it is summarized in circulars, issued daily. The "board" is a convenient but not an essential part of this system. Some railroads do not use a board at all; they keep all their "passing" records on paper.

To facilitate telegraphing in some of these "passing-report" systems, each car may be given a symbol after the train is made up. The symbol consists of a letter or group of letters, which indicate the station of origin, and a number to designate the car. The car is

known by this symbol until it reaches its destination and the contents are delivered.

The average rate of speed over long distances for carloads of perishable freight depends largely upon the character of the roadbed and the number of transfers from one railroad to another. From Los Angeles to Chicago and from Jacksonville, Florida, to Chicago the rate of speed averages about 13 miles an hour, including all stops. One train was scheduled to run from Los Angeles to Chicago in 173 hours and 25 minutes, the average rate being 13.1 miles per hour. A vegetable express run from Jacksonville to Chicago over three or four different railroads covers about 1,140 miles in $89\frac{1}{2}$ hours, the average rate being 12.7 miles per hour. By another route the trip from Jacksonville to Chicago is reported to be made in as short a time as 84 hours. Over some routes which do not traverse mountains the average rate, including stops, is about 16 miles per hour for long distances. A certain train from New Orleans to Chicago covers 930 miles in 57 hours and 20 minutes, the average rate being 16.2 miles per hour; and on the Atlantic Coast a train carrying Florida produce northward runs from Tampa, Florida, to Richmond, Virginia, in 54 hours and 15 minutes, making an average of 15.8 miles per hour. After a train is once made up and does not have to stop so often to receive new cars the rate of speed is naturally much higher. Between Memphis and Chicago the average rate of speed for a certain train is 18 miles per hour, while the rate from New Orleans to Memphis is 14 to 15 miles per hour. From Tampa to New York the rate for the distance south of Potomac Yard, Virginia, is about 16, while the distance between Potomac Yard and New York is covered at an average rate of more than 18 miles per hour.

At the rates of speed mentioned in the preceding paragraph, a train would run from 312 to 432 miles in 24 hours. The time taken to move cars from Potomac Yard, Virginia, just south of Washington, D.C., to New York, is about $12\frac{3}{4}$ hours; to Boston from Potomac Yard, $36\frac{1}{2}$ to 40 hours; and to Montreal, $46\frac{3}{4}$. These figures include the time required for icing and for transferring the cars from one road to another. From Miami to Chicago the time required is about 108 hours. It is thus possible for fruit and vegetables grown in regions as far away as southern Florida to be delivered to consumers in Chicago or New York within five or six days from the time of gathering.

While these fruit and vegetable trains, as any others, may be late sometimes, nevertheless their regularity is such that transactions are

reported to be made often, if not usually, with the expectation that the produce involved will be delivered at about a certain time on a certain day. For instance, a car of vegetables from a South Atlantic shipping point may be bought by a dealer, who expects the car to reach Jersey City on a Friday night in time to be ferried across North River to a wholesale market in New York, which opens at 1:00 A.M. Should this car be delayed several hours the vegetables would miss the Saturday market and might be delayed two days in reaching the retail merchants.

Two instances of delays will serve as illustrations. A merchant in Philadelphia mentioned a consignment of strawberries which reached that city from Florida six days late, and a Chicago dealer complained, about the same time, of losing $500 on a car of strawberries that reached him too late to take advantage of a good market. Delays like these, it is believed, are by no means as frequent under present conditions of freight service as in earlier times.

Information as to the location of a given car in transit may usually be obtained from the railroad company which is hauling the car. But some large shippers have a system of their own by which they trace the movement of cars in transit, in order to distribute them among the different markets to the best advantage. One organization in California adopted this system of distributing shipments: When a member shipped a car of produce, he turned the bill of lading over to the manager of the organization and allowed him to direct the movement of the car to market. The object of having one central authority select the markets was to prevent sending an oversupply to any one place. On receiving the bill of lading, a record of the car was made on a card in the office of the organization and the card filed in its proper place in a drawer. This drawer was divided into several rows of compartments, opening upward; each row had 31 compartments, and there was one row for each principal market in the United States. The 31 compartments represented each one day of a month. When a card was filed, its location was determined by the destination named in the bill of lading and by the day of the month on which the consignment was due at the destination. For instance, a carload of cherries shipped to New York from a point in the Sacramento Valley on May 27 would be represented by a card filed in the New York row of the drawer and in the compartment numbered 7, if the consignment would be due in New York on June 7. The arrangement of these cards showed at a glance the intended distribution of this association's

shipments among the different markets, and when too many consignments of a given kind of fruit were on the way to a given market the grouping together of several cards in one box served as a warning that the destination of one or more cars should be changed. This drawer showed only such fruit as was shipped by this association. News of other shipments and of their probable time of arrival at destination was secured, to some extent, by the association. When it became known that a certain market was about to receive an oversupply of a given fruit, one or more of the shippers who had consigned to that market would be notified by the association manager, so that they might select another city to which to divert their consignments. In case they should refuse to make such a selection the rules of the association gave the manager the right to divert the shipments himself.

The movement of a car in transit was traced by the association by a system similar to that used by some railroads. Each car shipped East by the association was reported by telegraph as it passed certain points along the way.

In a similar way other large shippers keep in close touch with the progress of a car on its way to market, at the same time keeping informed as to the prices and relative supplies in different cities and towns.

For produce moving from the South northward many of the principal points of diversion are along the Ohio and Potomac rivers, but the route of a car may be changed at any one of a large number of railroad-junction points. Cairo, Louisville, Cincinnati, and Potomac Yard (near Washington) are important points from which these shipments are distributed among various destinations.

Between eastern markets and producing regions in the far West and Southwest the chief points of diversion include Minnesota Transfer (between St. Paul and Minneapolis), Council Bluffs, Chicago, and St. Louis. Over one route from central California to the East the principal points from which one leading shippers' association receives "passing" reports are Roseville and Truckee in California, Ogden, Council Bluffs, and Chicago. A Cincinnati firm may receive notice of a Florida shipment when the car passes Jacksonville, Atlanta, and Chattanooga, and another notice just before the arrival at Cincinnati. On peaches shipped by this fast-freight service to northeastern markets from Tampa, a car's progress over a certain route is reported from Jacksonville, Florida; Savannah, Georgia; Columbia,

South Carolina; Hamlet and Raleigh, North Carolina; Richmond and Potomac Yard, Virginia.

The service of diversion includes not only changing the destination of a car in transit but forwarding it to a destination beyond the one originally named. For instance, a car shipped to Cincinnati may be forwarded under certain conditions to Indianapolis for unloading; or, it is reported, a car consigned to a given town may be partly unloaded there and the remainder of the consignment sent on to another town. This, however, costs more in freight than would a direct shipment of a full carload to one market.

Conditions on one route will illustrate how the system of reporting car movements may be used by a patron of the railroad. Suppose a dealer in Chicago, on a Thursday morning, wishes to know the location of a carload of tomatoes which were shipped to him the morning before from Crystal Springs, Mississippi. He makes the request of the railroad company's agent in Chicago, giving the initial and number of the car and the date and place of shipment. On consulting the "passing" reports it is found that this car, known in transit by the symbol "CS-4," passed Fulton, Kentucky, at 6:00 A.M. that day (Thursday) and would be due at Cairo, Illinois, at 8:30 A.M., or, let it be assumed, about an hour after the time the dealer made inquiry. It would be due in Chicago Friday at 4:50 A.M. With this information the dealer knows that, if he desires to divert the car, he may select one of a number of markets located north of the Ohio River. He knows that there is a large movement of tomatoes toward Chicago and believes that the prices on Friday will be better in some other places than in Chicago on the day his produce is due on the market. He has already received news from some points. An associate in St. Louis may have telegraphed the evening before that the supply already in that market, together with what was due to arrive on Thursday, would be about as much as could be sold at fair prices; that, if more was received, prices would probably be low. On the other hand, a report from Indianapolis may indicate good prices for Friday morning, better ones than are promised in Chicago for that day; so the Chicago dealer orders the car to be diverted to Indianapolis. He may wait until 3:00 P.M. Thursday before reaching this decision, so that he may hear from other markets. Meanwhile the car has been moving northward. The order for diversion is sent by the superintendent of transportation to the proper official at Effingham, Illinois, where the car is due to arrive about 5:45 P.M., and

where transfers are regularly made for Indianapolis. It reaches that city early Friday morning, about the time it would have reached Chicago had there been no diversion.

186. CONCENTRATION AND STORAGE-IN-TRANSIT PRIVILEGES[1]

By T. F. POWELL

The lack of proper assembling methods is one of the chief difficulties encountered in a successful solution of the marketing problem. In localities where suitable common or cold storage facilities are available, the growers of farm products would find the concentration and storage-in-transit privileges two of the most desirable means for bringing about the widest distribution. Shippers, as a rule, are not familiar with these arrangements; if they were utilized more frequently it would enable shippers to move their freight to market in carload lots, thus securing the benefit of the lowest rates and the quickest service.

Concentration is defined as the shipment in less than carloads of certain commodities to certain points, after which the shipments are reforwarded in carload lots.

Storage in transit is defined as the shipment in carloads to storage points of freight which has already been combined into carload lots under or independent of the concentrating arrangement.

The concentrating privilege at the present time is confined largely to butter, cheese, eggs, and poultry and permits of grading, mixing, repacking, and storing. Under this arrangement live poultry in carloads is frequently shipped to a concentrating point and dressed poultry in carload lots is forwarded from such concentrating point. In some cases special any-quantity rates are provided to concentrating points. In other cases the carload rate in effect from original point of shipment to final destination is applied plus an additional charge of 5 or 10 cents or more.

The storage privilege is allowed on all of the above commodities, and concentrated carload shipments of such commodities forwarded from a concentrating point in some sections may be stopped once in transit for storage. *Storage in transit* independent of the concentrating privilege is allowed also on green apples in packages, onions,

[1] From *Farmers' Bulletin 672, United States Department of Agriculture*, pp. 15–16.

potatoes, celery, hay, grapes, and other produce in carload lots for periods varying from six months to a year.

The privilege is granted free of charge in rare instances. Usually an additional charge of from $1\frac{1}{2}$ to 3 cents per 100 pounds is made. Ordinarily the shipments pay full tariff rate to the storage point, and when reshipped the charges are adjusted on the basis of the through rate in effect at date of original shipment from point of origin to final destination plus the storage charge. Where both the concentrating and storage privileges are used, a separate charge for each privilege is made.

The *concentrating privilege* can be utilized most successfully in cases where several small points of production of a particular commodity in certain districts are somewhat widely separated. It would be of advantage in such cases to concentrate small shipments and combine them into carload shipments at certain points and move them from these concentration points to distant markets or, by also utilizing the *storage-in-transit privilege*, to put the freight into storage at some convenient point and afterward move it to final destination at the carload rate. Arrangements of this kind would enable small producing points to reach markets which otherwise would be out of reach, and would benefit the railroad by giving them a long haul on the traffic.

Concentrating rates are also of benefit to the railroads by increasing the size and regularity of shipments. They benefit the shippers by enabling them to secure the carload rates, to secure quicker service, and to permit them to supply the market at times when their products are most in demand. Both of the privileges are susceptible of much greater development in all sections and should be encouraged by the railroads. It would be well worth while for the railroads, as well as associations of shippers in various sections, to make a closer study of the suitability of such arrangements in particular localities. Such a study should be of especial interest to the shippers in the South, where many new problems connected with the distribution of new products must constantly arise for solution as crop diversification progresses.

If shippers feel that either of these transit privileges would be of benefit and are prepared to supply suitable warehouse facilities, they should then arrange to confer with officials of the interested railroads. In this way a friendly discussion would develop as to how the arrangements could be made to fit any particular local conditions. Shippers

should always keep in mind, however, that service is the only thing the railroads have to sell and they should be willing to pay the railroads a fair additional charge for this or any other benefit which involves an extra cost on the part of the railroads, and which renders the service more valuable to the shippers.

187. CAR SUPPLY IN RELATION TO MARKETING THE WHEAT CROP OF 1914[1]

By G. C. WHITE

Since trade journals and railway periodicals have called attention to a possible car shortage, the Office of Markets has undertaken an investigation to ascertain to what extent a car shortage this year is anticipated by the grain trade, on what roads shortages are most acutely felt, to what extent the trade keeps in touch with the roads, advising prospective needs, what information is given out by the roads as to ability to fill all orders promptly or steps taken to minimize shortages, and whether or not the car supply keeps pace from year to year with the increasing need for cars.

The sentiment among country elevators is by no means universal that there will be a car shortage; terminal elevators are more nearly unanimous. As to where shortage is most acutely felt, opinions differ—apparently according to the particular road on which a man's elevator is located. Car supply is sometimes due to the volume of inbound merchandise, which, when unloaded, makes available empties for outbound grain shipments. Points served by more than one road testify that they can get cars even when non-competitive points are suffering from a shortage.

Information from the country elevators is, for the most part, that their advice to the roads of cars needed is in the form of orders for cars at the time they are wanted. Terminal elevators and large grain dealers, however, have kept in closer touch with the situation and have advised the carriers as far in advance as possible of the prospective needs.

On the part of the roads statements from officials through the press are given to the public, and growers and elevator men are personally advised by local agents, traveling freight agents, and other representatives of all steps taken to minimize shortages. Every purchase

[1] Adapted from "The Agricultural Outlook, July 21, 1914," *Farmers' Bulletin 611*, pp. 23–25.

of new cars is advertised and assurance is given that all cars are being put in condition to handle bulk grain. In some cases large numbers of stock cars are being temporarily fitted up for handling grain. As far as possible, foreign empties are being held by the grain-carrying roads, and country sidings are being filled with empties for the first rush.

It is the consensus that the increase in car supply does not keep pace from year to year with increasing need for cars.

Only 58.1 per cent of the wheat produced is shipped out of the county where grown, and on this basis the number of cars required to move the winter wheat crop of the United States would be 304,444 and 178,948, for that of seven most important wheat-growing states. On the same basis it would require approximately 432,000 cars to move the entire wheat crop of the United States.

The total number of box cars owned by all the roads in the United States June 30, 1911 (the last report available), was 990,313. Taking 15 of the principal roads in the seven states covered by our investigations, we find that they had on July 30, 1913, 60,446 miles of road and 223,487 box cars. Their aggregate mileage increase for the two years from June 30, 1911, to June 30, 1913, was 3 per cent, the increase in the number of their box cars, 3 per cent, and the increase in the tonnage capacity of their box cars, $7\frac{1}{2}$ per cent. The figures for individual roads vary from a decrease of 14 per cent in the number of box cars to an increase of 32 per cent, and in tonnage capacity from a decrease of 5 per cent to an increase of 50 per cent. These 15 roads contain approximately 25 per cent of the entire mileage of the United States and own approximately 22 per cent of all the box cars. The seven states in question produce approximately 40 per cent of all the wheat of the United States. What the percentage of increase is over the 1911 crop is hard to determine for the area served by these 15 railroads, but it is safe to say that it has been far greater than the percentage of increase in car supply, inasmuch as the estimated yield of winter wheat for the entire United States for 1914 exceeds the 1911 crop by 52 per cent, and the increase in car supply during 1913–14 has been below normal throughout the country.

These figures are given, not as furnishing an exact formula for determining the number of cars needed to move this year's wheat crop and for estimating the shortage in number of cars, but as indicating some of the factors to be taken into consideration in the problem of car supply and car shortage. Other factors are these: The wheat

harvest will extend over 3 months or more from about June 10. Doubtless much wheat will be stored after harvest awaiting better prices. Not all the cars of any road serving the wheat belt are available for wheat traffic. The Santa Fe system, for instance, with extensive mileage in New Mexico, Arizona, and California, must necessarily keep a large part of its cars confined to the business of those states. Account must be taken of general commercial conditions also, and of whether the tonnage of other commodities handled in box cars is above or below normal during the wheat movement. Indications this year are for a heavy crop of corn and oats, the movement of both of which commodities will still further complicate the situation as regards wheat.

In the long run every man gets all the cars ordered, and from that point of view there is no shortage. No statement of "car shortage" means anything until we know the time limitation and other conditions on which it is based. In its semi-monthly bulletins of car surpluses and shortages the American Railway Association lays down the rule that the figures must represent the differences between "cars ordered" on a given day and "cars available." "Cars available" is defined as any empties of the kind ordered, either en route in trains or on sidings, which can be used to fill the orders of that day, and includes also such loaded cars as will be made empty within 24 hours.

The opinion prevails in some sections that any shortage this year will be due more to lack of motive power and terminal facilities than to lack of cars. One of the greatest drawbacks has always been failure to load and unload promptly and too frequent reconsigning of shipments. The indications are that shippers and carriers are co-operating this year more closely than ever before in their efforts to avert a car shortage in the movement of the wheat crop.

188. TERMINAL FACILITIES[1]

The principal purpose of this Committee has been to show how the difficulties and expense surrounding the terminal situation in New York City have increased during the past ten years with particular reference to food products, rather than to consider the terminal element in food costs absolutely, although certain facts in regard to the latter will be referred to. The keynote of the terminal problem of

[1] Adapted from *Report of the Committee on Terminals and Transportation, of the New York State Food Investigating Commission*, pp. 20–34.

New York City is its geographical location. Owing its greatness to an unsurpassed harbor, its very strength has become a source of weakness in the handling of its internal commerce, and in economically providing the necessities of life for its inhabitants. As a result of the city's maritime and commercial pre-eminence its population includes approximately five out of the nine million persons living within the borders of the state. Furthermore, its growth has been particularly phenomenal in recent years. Between the census of 1900 and that of 1910 the city as a whole increased 39 per cent.

It has not been possible to secure exact figures in regard to the increase in the receipts or consumption of food products in the city during this same period, but it may properly be assumed that their increase has been commensurate with the increase in population. The mere fact that the amount of food received has increased 39 per cent in a decade would be sufficient to account for a serious terminal problem. The most cogent consideration, however, and that which even more than the amount of the increase has led to increased terminal difficulties in this city, is the distribution of the increase among the various boroughs. By far the most marked increases in population occurred in the boroughs of the Bronx and Queens, the most remote portions of the city. During the same period not only have the terminal facilities failed to keep pace with the growth of the population, but they have also failed to follow the population in its spread away from the old centers where the long-established railroad terminals are found.

Some of the most important difficulties resulting from this situation may here be pointed out. As stated above, the terminals have not followed the population. There has been considerable terminal development in the Bronx and Queens to be sure, but it has not been proportionate to the increase in population in those sections, and even had it been proportionate the problem would not have been entirely solved, since the principal receiving point for produce continues to be the lower west side. This is because the downtown terminals have developed into well-recognized markets for food products and their removal would greatly disturb commercial conditions. Therefore, as the population which consumes the food products has gradually spread away from the terminals, the haul from the terminals to the ultimate consumer has correspondingly increased. As nearly as can be ascertained, the primary trucking haul—that is, from the terminal to the first stopping place of the commodity—has not increased, as the

primary storage points are still located near the terminals. But the secondary and tertiary hauls from the primary storage points and from subsequent distributing points have increased most substantially, increasing, of course, the cost to the consumer.

Nor is this the only effect which the increase in the food traffic has had on the cost of delivering it. As a result of the greater quantity of this traffic in proportion to the terminal facilities, it is probably true (although accurate information is not obtainable) that considerable expense results from the delay to trucks at terminals while awaiting an opportunity to take delivery of their freight. This time must, of course, be charged against the commodity to be delivered.

Waste similar to that of competitive distribution is also found in the competitive assembling of many foodstuffs at initial shipping points, although this condition is probably less obvious because more widely scattered. Many buyers and commission men conduct their business in the various fruit and produce districts where such commodities as apples, peaches, cabbage, and celery originate, as a result of which shipping facilities, warehouses, and storehouses are duplicated and much expense and delay in the switching and handling of cars results. Furthermore, numerous shipments are made in less-than-carload lots at rates higher than would be applicable were all of the shipments in carloads, while the holding of the cars until a full load can be secured conduces to the uneconomical use of railroad equipment.

Frequently a shipper, in order to make sure that his shipments will be fully protected, will order the maximum number of cars which he may need as a result of which some when tendered may be rejected or held on tracks under demurrage which also conduces to uneconomical railroad operation. Indeed, the present unorganized method of assembling and forwarding foodstuffs from points of production produces acute competition for transportation facilities, often resulting in great hardship upon individual shippers and imposing a burden upon the carriers largely in excess of that which would be necessary under more economical methods.

We have already indicated how few rail terminals there are in New York City. The majority of deliveries are made at piers which are reached either by floating cars and placing them upon tracks on the piers by means of float bridges or by transferring freight in bulk by means of lighters, in which case the lighters are tied up alongside the pier where delivery is to be made and the freight unloaded on the

pier. By far the largest part of the freight coming into New York City is handled in this way. The arrival of the freight at its destination, whether in a car on a track, in a freight house, or on a pier, does not complete the service which the carrier performs. The rate charged for the transportation covers not only the movement of the freight, but the holding of it for a considerable period of time free of charge. In many instances this latter service is almost as valuable to the shipper or consignee as the transportation itself. Thus, carload freight which is tendered to the consignee in the car on a delivery track is allowed two days' free time before track storage or demurrage charges are imposed. This is in theory intended to allow the consignee an opportunity to unload the car. In many instances, however, two days is greatly in excess of the amount of time necessary for the actual unloading, and the time is used as a free storage period to assist the consignee in the conduct of his business. In the case of freight shipped in less-than-carload lots to New York City, Brooklyn, and Jersey City, it is held free of charge for three days, Sundays, legal holidays, and the day of arrival excluded, and at the end of that time if not removed a storage charge is imposed of five cents per 100 pounds for each thirty days or fraction thereof. In the case of carload freight shipped to New York "lighterage free," ten days' free time is allowed, excluding Sundays, legal holidays, and the day of arrival, while waiting the order of the consignee for final delivery. The same free time is allowed on less-than-carload freight shipped to a specific New York City station if it is held for orders at the request of the consignee. At the expiration of this period of ten days the freight is stored at a rate of one cent per 100 pounds for the first ten days, and one-half cent per 100 pounds for each succeeding ten days. Freight so stored may subsequently be delivered at any point within the free lighterage limits of the port within six months after being placed in storage.

In the case of freight shipped to New York "lighterage free" and subsequently delivered to vessels for export, thirty days' free time is allowed. In the case of perishable freight in refrigerator cars, ten days' free time is allowed, and if it is not removed at the expiration of the free time it is held in cars under refrigeration at a charge of one cent per 100 pounds for the first ten days and one-half cent per 100 pounds for each succeeding ten days.

The time of arrival of various products in New York City is so arranged that they may be available for the various markets, in order to avoid holding over until the next day, which would result in loss due to

shrinkage, or the necessity of selling after regular market hours. In the case of products so handled various special terminal facilities are provided. Thus milk is unloaded upon milk platforms in Jersey City and Manhattan and distributed to the consumer in time for breakfast. These platforms occupy valuable real estate, and are used for the milk traffic only in the morning when the milk is coming in and later in the day when the empty cans are returned. Nevertheless, these facilities are reserved exclusively for this business, because of the sanitary regulations of the board of health. The platforms and surroundings are regularly inspected, and must be kept absolutely clean and in a sanitary condition. With this end in view special precautions are taken, such as having the platforms washed every day and keeping the lower sides whitewashed. In like manner the roadways leading to these platforms must be given special care. All of these special facilities are accorded the consignees of milk without any additional charge. In the same manner, during the spring and summer months green vegetables and fruits are delivered to the market between Jay Street and Perry Street, North River, every morning in time for the early market. A number of roads also maintain auction rooms for the sale of fruit and vegetables.

D. Some Phases of the Storage Problem

189. REGULATING THE SALE OF COLD-STORAGE EGGS[1]

Every person, firm, or corporation who does a wholesale or jobbing trade in cold-storage eggs, or who offers cold-storage eggs for sale, is hereby required to mark all cartons and all cases containing eggs in cartons or otherwise with the words "cold storage," in a conspicuous place on the outside of the carton and case; and to mark plainly on the face of all invoices and bills the words "cold-storage eggs," in billing or invoicing, for the sale of eggs that have been kept in cold storage or refrigeration; and also to display in a conspicuous place in their place of business, in full view of the public, a card upon which shall be printed "cold-storage eggs sold here," in letters at least two inches in height.[2]

[1] Rules and bulletins issued by the New York State Department of Foods and Markets.

[2] Retailers were likewise required to post a sign "cold-storage food sold here" and issue with each sale of cold-storage eggs, a bill or invoice plainly marked "cold-storage eggs." They must also post a sign in full view of the public, in or near the container, bearing the words "cold-storage eggs" and the price plainly marked for which they are sold.

BULLETIN NO. 7

November 5, 1915

The information received by the Department is to the effect that eggs placed in storage in March, April, and May, at prices ranging from 18 to 21 cents per dozen, and which could be sold at wholesale at this time with a reasonable profit at 23 to 24 cents per dozen and retailed to the consumer at not to exceed 30 cents as cold-storage eggs, are being sold to the consumer at prices ranging from 35 to 60 cents per dozen. Besides being a hardship to the average family of modest means, this excessive price restricts consumption and indirectly discourages the production of eggs. It is to the interest of all concerned that, when there is a surplus and prices are low, eggs should be placed in storage for consumption in times of scanty production, and the investor must be allowed a fair percentage of profit for his investment and risk, but storage facilities is something of a public utility and excessive speculation in stored products is an injustice to the consumer and even of doubtful benefit to the dealer.

Under the authority of the state statute, retailers are directed to demand of their supply houses invoices plainly marked "cold-storage eggs," and housewives are requested to demand receipts from retailers plainly marked with "cold-storage" or "fresh eggs," as the purchase may warrant.

In any case of violation or refusal, or in any case where eggs bought as "fresh" are thought to be "cold-storage eggs," report should be promptly made to the New York State Department of Foods and Markets, 204 Franklin Street, New York City, with all the details of the transaction.

The present wholesale price of cold-storage eggs does not justify a retail price in excess of 30 cents per dozen for best quality cold-storage eggs. Such eggs are now on sale at various places in the city at this figure, and if the housewife is unable to secure her supplies at this cost, the Department will direct her to retailers who will be glad to supply them at this price.

The entire force of this Department, and the state and city health departments, numbering nearly 100 men and covering the entire city, have been directed to watch particularly from now on for the violation of the cold-storage law in the sale of eggs in the wholesale, jobbing, and retailing trade. Evidences of violation of the law will be gathered and reported, and where this evidence justifies, prosecution will follow. Sufficient warning has now been given to the trade, and where informa-

tion is received to justify prosecution, this Department will go into court and insist on the full penalty of the law in every case in which a conviction has been secured.[1]

JOHN J. DILLON, *Commissioner*
New York State Department of Foods and Markets

190. THE LENGTH OF TIME FOR WHICH GOODS ARE STORED[2]

BY GEORGE K. HOLMES

The movement into and out of storage of the six commodities covered by this investigation can well be compared in Diagram A. For instance, at the end of the diagram, in the section for eggs, the continuous line representing receipts shows at a glance that the bulk of the year's receipts go into cold storage in April, May, and June, during which time the deliveries, represented by the broken line, are almost nothing. The situation is reversed from October to January, when the receipts into cold storage are exceedingly small and nearly the entire deliveries of the year are made.

The equalizing of consumption throughout the year by taking into cold storage a portion of the supplies during the season of high production and distributing it for consumption during the period of low production is here illustrated. In the case of fresh beef, for instance, receipts into cold storage are heavy in September and October, while, as indicated by the broken line, the deliveries out of cold storage present only an undulating line, in a nearly horizontal position, throughout the year. The even distribution of cold-storage beef throughout the year is evident at a glance. The same observation holds true with regard to the distribution of fresh pork and quite so with regard to butter.

In the consumption of cold-storage dressed poultry, it should be remembered that the demands of Thanksgiving and Christmas are sufficient to cause an enormous increase.

The marked increase in the consumption of cold-storage eggs in the winter is compensatory to the marked decline of egg production

[1] In a later bulletin the commissioner says that after the publication of the above "many houses in the trade, wholesale, jobbing, and retail, as well as the trade press, have expressed a desire for the enforcement of the law and commended the determination of the Department to enforce the sale of cold-storage eggs as such."

[2] Adapted from "Cold Storage Business Features," *Bulletin 93, Bureau of Statistics, United States Department of Agriculture*, pp. 28–45.

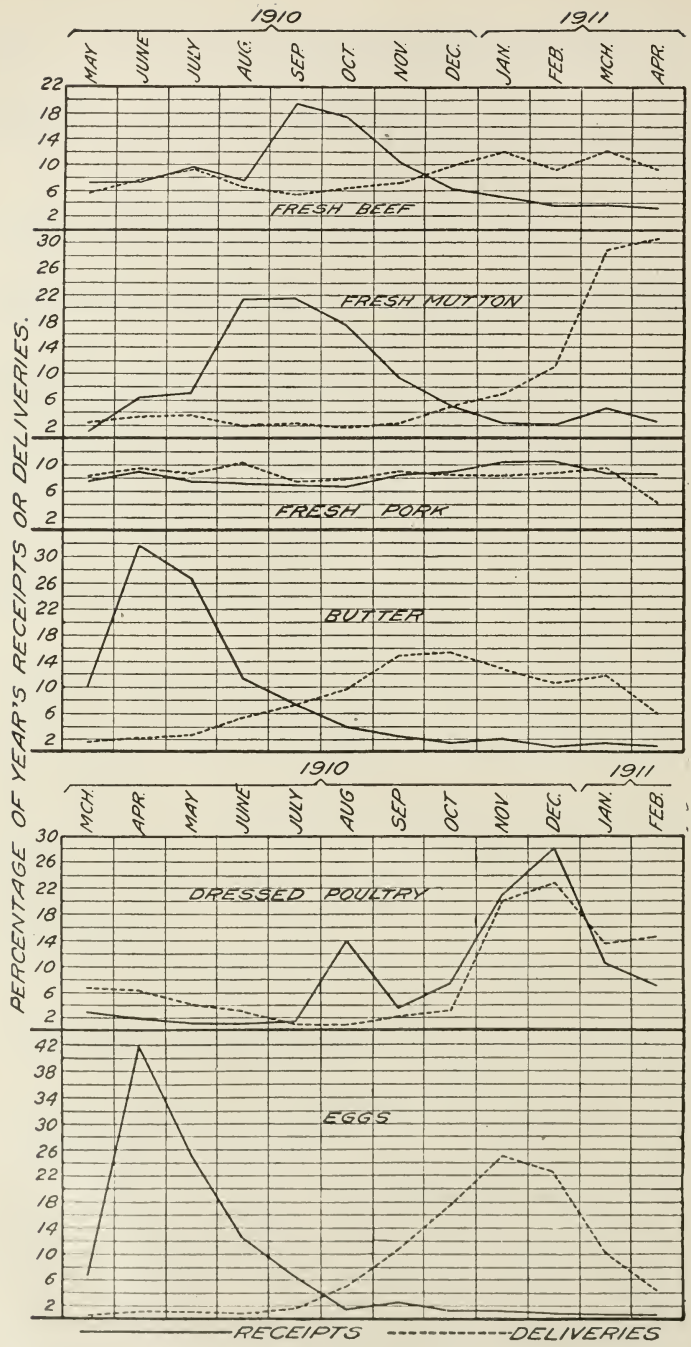


Diagram A.—Receipts into and deliveries out of cold storage in one year, 1910–11. [Receipts, 1910–11; deliveries from receipts of 1909–10 and 1910–11.]

during that time, and if the consumption of cold-storage eggs is combined with that of fresh eggs, the consumption of the two during the winter would be expressed by a depressed line.

Many persons imagine that goods are allowed to remain in cold storage for very long periods of time. This study of actual conditions indicates that the bulk of the beef is delivered within a period of seven months after entering storage and that a large fraction is stored less than one month. The movement of fresh pork is still more rapid, so that little remains after storage for two months. After dressed poultry has been stored for one month the exhaustion of the stored stock proceeds steadily, and after the lapse of half a year only a small fraction is continued in storage. The distribution of butter for consumption proceeds with comparative evenness from about the second month of storage onward for six months, so that by the end of the eighth month 88.4 per cent has been withdrawn. Eggs are commonly kept in storage for from six to nine months, and by the end of ten months 97.2 per cent have been taken out. (See table.)

PERCENTAGE OF RECEIPTS OF 1909–10 DELIVERED AFTER STORAGE FOR ONE, TWO, THREE, ETC., MONTHS

Months of Storage	Deliveries from Receipts of					
	May, 1909, to April, 1910				March, 1909, to February, 1910	
	Beef	Mutton	Pork	Butter	Poultry	Eggs
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Under 1	36.7	7.7	78.1	5.5	22.5	2.8
1	10.3	6.9	11.9	9.9	26.1	3.1
2	11.3	5.3	3.2	12.0	14.8	3.8
3	12.9	8.9	2.0	12.8	12.3	4.6
4	14.8	13.9	1.3	13.2	9.6	8.3
5	8.8	19.5	1.0	14.5	5.7	13.8
6	3.3	28.8	1.2	13.6	3.1	18.0
7	.9	8.3	1.2	6.9	2.0	21.4
8	.3	.1	*	4.5	1.4	13.8
9	.3	.1	*	3.7	.8	7.6
10	.1	*	*	1.2	.6	2.7
11	*	*		.1	.3	.1
12	*			1.0	.3	
13	*			.1	.1	
14	*			*	.2	
15	*			.1	.1	
16	*			*	*	
17					*	
18					*	

* Less than 0.05 of 1 per cent.

The fresh beef received into storage during the year beginning May, 1909, was kept there on the average for 2.28 months; the fresh mutton, 4.45 months; the fresh pork, 0.88 of one month, and the butter, 4.43 months. The poultry received during the year beginning March, 1909, was kept on the average 2.42 months; the eggs, 5.91 months.

It is apparent that long storage is exceptional. The costs of cold storage are running against the prices of the commodities month by month. The owners must use good judgment and take their goods out of storage before the costs of storage, added to the original cost of the goods and some profit, will raise the total amount of cost above the market price. Sometimes the owner of the goods errs in judgment and fails to make a profit; again, he fails to get back the cost of goods and the costs of storage; and yet again he gets back all costs and a large rate of profit.

If the three costs—for space in the warehouse, interest on the value of the goods stored, and insurance upon them—are combined, they amount to 0.437 of 1 cent per pound of fresh beef per month, or 3.5 per cent of the mean wholesale price of beef from September to November, 1910; for fresh mutton the costs are 0.352 of 1 cent per pound, or 3.8 per cent of the mean wholesale price in the heavy storage months, August to October, 1910; for fresh pork, 0.397 of 1 cent per pound, or 3.7 per cent of the wholesale price; for dressed poultry, 0.446 of 1 cent per pound, or 2.8 per cent of the wholesale price; for butter, 0.571 of 1 cent per pound, or 2.4 per cent of the wholesale price; and for eggs, the costs amount to 0.593 of 1 cent per dozen, or 3 per cent of the mean wholesale price of eggs.

It is evident that, as the time of storage lengthens, the costs and their percentage of the wholesale price must be multiplied by the number of months. If the storage is for 6 months, for instance, the cost per pound ranges from 2.112 cents for fresh mutton to 3.426 cents for butter, and is 3.558 cents per dozen for eggs. The costs for 6 months range from 14.6 per cent of the wholesale price in the case of butter to 23.0 per cent in the case of fresh mutton.

191. THE LIMIT TO COLD-STORAGE SPECULATION[1]

By M. LIPPITT LARKIN

In the years 1902–5 the profits of the butter dealers attracted the attention of outside capitalists; not that they cared to enter the butter business proper, but that they wanted to reap a part of the

[1] Adapted from the *Journal of Political Economy*, XX (March, 1912), pp. 270–74.

profits by coming in between the creamery and the dealers. They bought butter to resell it to the latter. The immediate result was one which is customary in bullish markets. Prices went up. Moreover, the problem of ascertaining the actual demand became more complex. A false, unreal, speculative demand was created on the top of the market and people became freer in their purchases, steadily boosting up the price, unmindful temporarily of the work of the slowly operating negative forces, such as limited demand, decreasing consumption, substitutes, and imports, the influence of which is taken up below. Dealers themselves naturally were affected—they too began to speculate. To their assistance came the storage houses, which were, of course, anxious to increase the amount of goods put away in storage. The cold-storage business became so profitable that it invited serious competition, and new methods to attract the dealer became necessary. Lowering the rates for storing was not enough of an inducement and it would cut the profits. To begin with, they took over the very legitimate work of lending money on butter at the regular banking rates. Dealers cannot usually afford to lay out all the capital necessary to finance the storing of butter and they will rather borrow the money from cold storages than from banks, if not for any other reason than to be able to take out butter the moment they need it without going for the bank's release. Then there is the advantage of having a larger balance in the bank for an extra day.

But storage houses soon began to compete as to the amount lent on each tub of butter. For instance, up to 1908 the Quincy Cold Storage House had monopoly over the storage business in Boston. It did the legitimate business of keeping the butter in a certain temperature, leaving lending operations to the banks. The Boston Terminal Storage, when opening up in Boston in 1909, started at once to lend money on butter. The Quincy House had to follow. From $10 per tub the amount lent soon went up to $13, and finally the Boston Terminal, backed by capitalists, began to give $16 on 60-lb. tubs of butter. Moreover, they would allow a dealer to buy butter on drafts, attending themselves to the payment of the latter and collecting from the dealers the difference between $16 and the actual cost of the tub of butter. Thus the dealer had to invest very little—three or four dollars per tub. The result was that buying became very easy and dealers instead of storing the normal quantity that they were accustomed to sell to their trade began to speculate, buying for the sake of reselling to other dealers, who might go short.

The question arises here, What became of the butter? Obviously, one may think, it was consumed at higher prices, even if the consumption was accompanied by complaints at the high cost of living. Here again the existence of cold-storage houses served to cover the corresponding change in demand. The truth of the matter is that all of the butter was not consumed. To be sure, many consumers, unable to go without butter, kept on paying higher prices; but people to whom 10 or 15 cents on a pound of butter means a great deal used less of it, at the same time accustoming their digestion to butterine and oleomargarine. What then happened to the surplus supply of butter? The answer to this at once suggests the border line between the good and evil involved in the cold storage. The natural and the customary period for keeping butter in cold storage extends from July to the end of March. The output between March and the end of June is usually equal to the demand at customary prices. People then should have fresh butter during this period, and correspondingly cold storages should remain empty up to the end of June. Beginning with 1904 these storing periods began to move forward at the end and backward at the beginning of the period. In 1909 there was plenty of storage butter at the end of April and new storing began exceptionally early in June; speculation kept the price for the fresh butter high enough with a view to the new storing season, so a smooth surface was kept on the butter market. It is obvious that a crash had to come, since carrying over butter from one season to another, even if possible from the point of view of preserving the butter in good shape, is a very risky enterprise, practicable only when the approach of a famine is certain. But such a conjuncture never actually takes place. Moreover, early butter, coming in during May and June, cannot stand storage. Thus the supply in one year was consumed at the expense of storing the supply of the coming year and so on until if it had not been for the crisis we should soon have reached the impossible situation of keeping a constantly increasing supply with correspondingly decreasing demands. Many dealers expected the crisis early in 1910 and lost heavily by being forced to pay high prices to speculators, who continued to be optimistic.

Other forces, too, were active in undermining the upward price movement. First come the substitutes. Butter was simply driven out from many markets, butterine took its place. Next in importance comes the question of importing butter from abroad. Maine, Ver-

mont, Massachusetts, New Hampshire actually attempted to import butter from Canada, paying five cents duty per pound. But dealers discovered a more convenient way of fighting high prices; they imported cream and churned butter on this side of the fence, the duty on cream amounting to only fifty cents duty on thirty-five pounds of butter. All creameries on Prince Edward Island, for instance, closed their cheese factories in 1909–10 and shipped their cream to Boston.

To conclude, the maximum price for butter is firmly determined on one side by the fact that the total yearly output must be consumed within one season and on the other by the possibility of imports and increased use of substitutes accompanied by a decreasing demand for butter. The difficulty in the years 1908–10 was that, owing to over-speculation and an unwarranted trade optimism, business men simply ignored the economic principles underlying the price mechanism. When, in January, 1911, reports came that the total amount of butter in storage houses exceeded the previous year's storage provision by eighteen million pounds, a crisis became inevitable. This was precipitated by the actions of speculators and the storage houses. The former, not having a definite retail trade to rely upon in disposing of a certain amount of their holdings, were the first to swamp the market. Outsiders to the trade, they cared little for stability and steadying measures which would have been adopted had the butter been in the hands of dealers. The latter would drop the price steadily, increasing consumption and thus avoiding trade demoralization. With the fall of prices, cold storages began to demand additional collateral from the dealers. One morning in January every dealer in Boston received a demand note from the Quincy Storage House to put up $2 per tub. They refused in a body to do this, the popular opinion being that the storages must stand by the dealers in a panic after having enriched themselves in the fat years. But the wave could not be stemmed any longer. Failure followed failure. The storage houses left with butter on hand began to throw their holdings upon the overloaded market. Dealers releasing butter at the rate of $16 per tub were glad to sell it at $12. It became evident that it would be impossible to dispose of the supply before new butter should commence coming in. Thus all the profits made within the preceding five years were wiped out only because dealers ceased consulting economics and were carried off their ground by the possibility of sudden fortunes.

192. WAREHOUSING HELPS THE FARMER TO GET BETTER PRICES[1]

By EDWIN HOBBY

The bankers' warehouse campaign in Texas has largely increased the permanent and dependable facilities for the storage of cotton in Texas. When this campaign began (June, 1915) there were 400 warehouses in Texas, having a total storage capacity of approximately 800,000 bales. Today (December 7, 1915) there are completed or in course of construction in Texas, 628 warehouses, having an aggregate storage capacity of 1,500,000 bales. Thus it may be truthfully said that one result of the bankers' warehouse campaign in Texas has been to increase the number of cotton warehouses in the state by 228, and to increase the permanent dependable storage capacity of the cotton warehouses of the state by 700,000 bales.

It is safe to say that as a result of the added warehouse facilities which the bankers' campaign has produced there are stored in Texas warehouses at this moment 800,000 bales of cotton, including that in storage at Texas ports, and that this amount exceeds by 300,000 bales the aggregate number stored in warehouses within the state at the same period of any previous year. But for the warehouse facilities brought into existence by the bankers' campaign, it is safe to say that 500,000 bales of cotton which are now held in storage would have been sold near the beginning of the cotton season. This cotton, if sold at that time, would have brought at the then market price approximately $20,000,000. Today it is worth at the present market price $30,000,000, so that it would seem logical to say that as a result of the bankers' campaign in Texas $10,000,000 has been saved to the producers of the cotton now stored in warehouses, by enabling them to hold it until this time, to say nothing of the million bales of cotton held by farmers and merchants which are in open yards and in private storage.

But this is only a part of the money-saving that has resulted to the cotton-producers and the people generally. The facilities which have enabled the people to store and hold 800,000 bales of cotton have at the same time increased the price of every pound of cotton that has been sold since the effects of this campaign began to operate, and it is safe to estimate that $45,000,000 have been saved as a result of this

[1] Adapted from an address at the Conference of Cotton States Bankers, New Orleans, December 6–7, 1915. Stenographic report of proceedings loaned by the secretary, Mr. Moorhead Wright.

increase in the price of cotton which has been sold. Although the acreage reduction was an important factor, the prices would have continued below the cost of production in the event that the bankers' warehouse campaign had not been inaugurated, particularly after the British cotton contraband order became effective.

But, valuable as the direct financial saving which has resulted from this campaign has been, this is dwarfed into insignificance by its great educational value for the future. This campaign has taught the people of Texas that cotton can be prudently and profitably stored in warehouses, has taught them how to do it, and has gotten them started to doing it. It has taught the cotton-growers, the homesteaders, and the tenant farmers what the benefits of cotton warehouse facilities are. It has taught them that when the cotton market is glutted or when it is closed by a money panic, as it was in 1907, or by a world-wide war, as it was in 1914, they are not compelled, if adequate and dependable warehouse facilities are provided, to sell their crop for whatever price they can get from greedy and merciless speculators, but can deposit it where it will be safely and economically kept, and receive in return for their deposit a warehouse receipt upon which they can borrow sufficient money to meet the urgent needs which otherwise they would be compelled to sacrifice their year's product to liquidate. The most difficult phase of the movement to provide cotton warehouses in Texas has been that of inducing farmers themselves to understand the operation of a warehousing system and to appreciate its value. It has been found extremely difficult to explain to a large element of the people how it was at all practicable or possible for them to pursue any other course in the fall of the year, than the time-honored course they have always pursued, of hauling their cotton to market, taking whatever price they are offered for it, and using the proceeds as far as they would go in meeting their inevitable obligations. It was difficult to convince them that a warehousing system would save them money, because they had never seen it worked, but it is not difficult now to convince any one of the thousands of cotton farmers in Texas, who, in September, 1915, instead of selling his cotton at 8 cents a pound, the price he was then offered, placed it in a cotton warehouse, and borrowed money on his warehouse receipts to pay his pressing debts, and later sold this self-same cotton at 12 cents a pound.

XI

THE RENT AND VALUE OF FARM LAND

Introduction

But first, a word concerning distribution in general.

The present chapter constitutes the beginning of a new division of our subject—the distribution of agricultural income. We have been examining, in chapters iii to x, the process by which wealth in the form of agricultural goods is produced. We have seen how the labor of the rural portion of our population, together with the assistance of such implements and appliances as they can secure, is applied to the resources of nature, for the purpose of producing certain plant and animal products. We have observed further how these producers of agricultural goods seek to market that part of their product which is converted into cash in such manner as to secure for it as high a price as possible. The ultimate aim is, of course, to make the farm enterprise yield the largest total of wealth in return for the goods and effort put into it.

But the enjoyment of wealth is a personal matter, and the individual is concerned about the way in which a private income for himself is to be carved out of the total sum of wealth produced by the industry in which he has participated either by personal effort or by the use of property which he owns. Accordingly, we shall now, in a sense, retrace our steps and examine the relations of the several factors of the productive process from the point of view of the claims to income which are created by reason of the assistance which they have each contributed to the process. We shall inquire what claim the landlord is able to enforce upon the farmer who grows crops upon his land. Then we shall ask what percentage of the value of equipment the one who advances capital can require each year of him who uses it. Next, what of those who do the actual work? The laborer, worthy of his hire—what wage is he able to collect? And finally, what of the surplus profit which remains to be enjoyed, or of the ultimate loss which remains to be borne by the enterpriser who has been responsible for directing land, labor, and capital into these particular lines of

endeavor? In a word, how is the wealth produced in the course of our agricultural operations distributed to its joint producers?

The simple doctrine of rent as a differential return to superior land or natural agents of production is readily grasped. This, however, is hardly an adequate account of the matter, until technical productivity is translated into full economic, i.e., value, terms. Granted that a tract of land possesses superior advantages of fertility, climate, or location, what shall be the market price at which the service of that land will sell? Evidently, the condition of the market for various classes of products will be one important factor. Prospective renters will contract to pay in proportion to what they expect to realize from their use of the land. Professor Taylor has clearly pointed out that that return will depend upon the character of the farmer as well as upon the character of the land, and selection 196 suggests that the size of the producer's surplus out of which rent is paid may be increased by hard work and cheap living as truly as by skilful farming. Careful analysis of factors such as these will serve to reveal the schedule of demand for land use. The natural conditions of supply of land and natural resources were pretty fully set forth in chapter iii, and the circumstances which make of it an *effective* supply have been discussed in chapters vi, viii, and x. These factors in the making of the market price of land-use might profitably be identified and classified from selection 203.

Nice distinctions must be drawn between economic rent, which is based on the idea of a "normal" return, and the commercial or contract rent which we meet in our business dealings. Not alone does commercial rent combine returns for the use of capital-goods along with true rent in a single payment, but the character of the renting contract is such as often to introduce conventional elements into the price of land-use, which considerably distort the price-making process. Section C furnishes numerous illustrations of this point.

Section D should be studied with considerable care, and this for two reasons. First, an understanding of the process by which economic rent becomes the basis of the valuation of land will save us from getting the cart before the horse and attempting to explain the high cost of living by the high cost of farm land. In the second place, it should have the practical value of teaching the prospective buyer of land how to analyze the factors which go to make up both the present

and the future value of a given tract, and thus buy and sell upon bases more rational than those commonly in use. A study of current prices of western fruit lands might be interesting in this connection.

A. The Basis in Differential Return

193. THE RICARDIAN DOCTRINE[1]

By DAVID RICARDO

Rent is that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil.

On the first settling of a country in which there is an abundance of rich and fertile land, a very small proportion of which is required to be cultivated for the support of the actual population, or indeed can be cultivated with the capital which the population can command, there will be no rent; for no one would pay for the use of land, when there was an abundant quantity not yet appropriated and, therefore, at the disposal of whosoever might choose to cultivate it. On the common principles of supply and demand, no rent could be paid for such land, for the reason that nothing is given for the use of air and water or for any other of the gifts of nature which exist in boundless quantity. If all land had the same properties, if it were unlimited in quantity, no charge could be made for its use, unless where it possessed peculiar advantages of situation. It is only, then, because land is not unlimited in quantity and uniform in quality, and because in the progress of population, land of an inferior quality or less advantageously situated is called into cultivation, that rent is ever paid for the use of it.

When, in the progress of society, land of the second degree of fertility is taken into cultivation, rent immediately commences on that of the first quality, and the amount of that rent will depend on the difference in the quality of these two portions of land. When land of the third quality is taken into cultivation, rent immediately commences on the second, and it is regulated as before, by the difference in their productive powers. At the same time, the rent of the first quality will rise, for that must always be above the rent of the second, by the difference between the produce which they will yield with a given quantity of capital and labor. With every step in the

[1] Adapted from *Principles of Political Economy and Taxation*, chap. ii, §§ 24–27.

progress of population, which shall oblige a country to have recourse to land of a worse quality to enable it to raise its supply of food, rent on all the more fertile land will rise.

Thus suppose land—Nos. 1, 2, 3—to yield, with an equal employment of capital and labor, a net produce of 100, 90, and 80 quarters of corn. In a new country, where there is an abundance of fertile land compared with the population, and where therefore it is only necessary to cultivate No. 1, the whole net produce will belong to the cultivator, and will be the profits of the stock (capital) which he advances. As soon as population had so far advanced as to make it necessary to cultivate No. 2, from which ninety quarters only can be obtained after supporting the laborers, rent would commence on No. 1; for either there must be two rates of profit on agricultural capital, or the value of ten quarters must be withdrawn from the produce of No. 1, for some other purpose. Whether the proprietor of the land, or any other person cultivated No. 1, these ten quarters would equally constitute rent; for the cultivator of No. 2 would get the same result with his capital, whether he cultivated No. 1, paying ten quarters for rent, or continued to cultivate No. 2, paying no rent. In the same manner it might be shown that when No. 3 is brought into cultivation, the rent of No. 2 must be ten quarters, while the rent of No. 1 would rise to twenty quarters; for the cultivator of No. 1 would rise to twenty quarters; for the cultivator of No. 3 would have the same profits, whether he paid twenty quarters for the rent of No. 1, ten quarters for the rent of No. 2, or cultivated No. 3 free of all rent.

It often, and indeed commonly, happens that before No. 2, 3, 4, or 5, or the inferior lands are cultivated, capital can be employed more productively on those lands which are already in cultivation. It may perhaps be found that by doubling the original capital employed on No. 1, though the produce will not be doubled, will not be increased by one hundred quarters, it may be increased by eighty-five quarters, and that this quantity exceeds what could be obtained by employing the same capital on land No. 3. In such case, capital will be preferably employed on the old land, and will equally create a rent; for rent is always the difference between the produce obtained by the employment of two equal quantities of capital and labor. If with a capital of £1,000, a tenant obtain one hundred quarters of wheat from his land, and by the employment of a second capital of £1,000 he obtains a further return of eighty-five, his landlord

would have the power at the expiration of his lease, of obliging him to pay fifteen quarters or an equivalent value for the additional rent; for there cannot be two rates of profit. If he is satisfied with a diminution of fifteen quarters in the return for his second £1,000, it is because no other employment more profitable can be found for it. The common rate of profit would be in that proportion, and if the original tenant refused, some other person would be found willing to give all which exceeded that rate of profit to the owner of the land from which he derived it.

In this case, as well as the other, the capital last employed pays no rent. If a third £1,000 be employed on the same land, with a return of seventy-five quarters, rent will then be paid for the second £1,000, and will be equal to the difference between the produce of these two, or ten quarters; and at the same time the rent of the first £1,000 will rise from fifteen to twenty-five quarters; while the last £1,000 will pay no rent whatever. If, then, good land existed in a quantity much more abundant than the production of food for an increasing population required, or if capital could be indefinitely employed without a diminished return on the old land, there would be no rise of rent; for rent invariably proceeds from the employment of an additional quantity of labor with a proportionally less return.

The most fertile and most favorably situated land will be first cultivated, and the exchangeable value of its produce will be adjusted in the same manner as the exchangeable value of all other commodities. When land of an inferior quality is taken into cultivation, the exchangeable value of raw produce will rise, because more labor is required to produce it. The exchangeable value of all commodities is regulated, not by the less quantity of labor that will suffice for their production under circumstances highly favorable and exclusively enjoyed by those who have peculiar facilities of production, but by the greater quantity of labor necessarily bestowed on their production by those who have no such facilities; by those who continue to produce them under the most unfavorable circumstances; meaning by the most unfavorable circumstances, the most unfavorable under which the quantity of produce required renders it necessary to carry on their production.

The reason, then, why raw produce rises in comparative value, is because more labor is employed in the production of the last portion obtained, and not because a rent is paid to the landlord. The value

of corn is regulated by the quantity of labor bestowed on its production on that quality of land, or with that portion of capital which pays no rent. Corn is not high because a rent is paid, but a rent is paid because corn is high; and no reduction would take place in the price of corn, although landlords should forego the whole of their rent. Such a measure would only enable some farmers to live like gentlemen, but would not diminish the quantity of labor necessary to raise raw produce on the least productive land in cultivation.

194. THE RENT OF AGRICULTURAL LAND[1]

By F. W. TAUSSIG

The typical case of rent, and the one which serves most readily to illustrate the principle, is that of agricultural land. Suppose that the producers at O, A, and B have farms of different fertility. A given application of labor and capital yields at O 25 bushels of wheat to the acre, at A 20 bushels, and at B 15 bushels to the acre. The price must be such as to make wheat-raising at B worth while; otherwise the total supply will not be forthcoming. The supply which can be raised at O and A is limited and an additional supply must be got at B before an equilibrium of supply and demand is reached. The price is high enough to bring normal returns to the producer at B for 15 bushels to the acre. The receipts from these 15 bushels also suffice to cover the expenses (including usual interest to capital) for the producer at A. The extra 5 bushels got from his land thus constitute an extra gain for him. Similarly the extra ten bushels at O yield an extra gain for the producer at O. And if the owners of A or O chose to let their lands, instead of cultivating for themselves, they could secure rents of 5 and 10 bushels to the acre (or the equivalent in money price). It is immaterial whether they secure the advantage from the better site in the one form or the other.

Rent is sometimes said to be the specific product of land. Similarly, interest is often said to be the product of capital, and wages the product of labor; and thus three elements in distribution—wages, interest, rent—are set aginst three factors in production—labor, capital, land. But this phraseology is to be used with caution. Labor applied in some ways (through the use of tools) yields more than labor applied in other ways; in this sense only is there a productivity of

[1] Adapted from *Principles of Economics*, II, 57–60. (Copyright by The Macmillan Co.)

capital. The same language should be applied to land. Labor on some land yields more than labor applied on other land; in this sense only is there a productivity of land. If land were unlimited in supply and all of uniform quality, the natural forces inherent in it would still be directed and utilized by labor; and in this sense there would be a productivity of land. But there would be no differential return on any one plot of land, no emergence of rent, no notion of a separate productivity of land leading to rent. Rent arises because of the limitation of the better sources of supply; because of differences in the amounts brought forth by equal quantities of labor.

Such is the fundamental principle of rent. But it requires many qualifications concerning the kinds and causes of difference in productive efficiency. Unless there were a tendency to diminishing returns from any one plot of land, there would be no such thing as rent. If the better sources of supply could be pushed indefinitely without any lessening of yield—if more and more labor and capital could be applied to a given plot of land, and could always bring an increase of product proportionate to the additional outlay—then those better sources of supply only would be resorted to. The less good lands would be left untouched, and all agricultural produce would be got from the best lands. The fact that good lands, mediocre lands, and poor lands are cultivated side by side, proves that at some stage a tendency to diminishing returns appears.

When additional labor and capital are applied to cultivation, it may be a matter of indifference whether they be applied to poorer land or to the better land under poorer conditions. In the preceding discussion, three grades of land were assumed, having yields, for the same application of labor and capital, of 24, 20, and 15 bushels to the acre. But it might also be supposed that the three applications of labor and capital were all made on the same land, yielding successively diminishing returns in the ratio of 25, 20, 15. In either case, the marginal product is 15. In either case, the 15 bushels constituting the last instalment will not be brought to market unless the price is such as to make their production worth while; hence, in either case, the other instalments bring a surplus or rent. In either case, the *margin of cultivation* is that stage in production where only the normal returns to labor and capital are secured. The margin is said to be extensive when poorer land is resorted to; it is said to be intensive when more capital and labor are applied under less favorable conditions to the better land. Difference in yield would appear, and hence

a differential return, even though all land were originally of the same quality.

Differences in situation have precisely the same effect as differences in fertility. An apt illustration of the effects of situation (first elaborated by the German economist Thünen) is got by supposing all land to be of the same quality, and to be situated on all sides of a central city to which its produce is brought for sale. Imagine concentric circles to be drawn about such a central point. Evidently the land in the nearer rings has an advantage over that in the more distant rings. All the produce is sold in the central market at the same price; but that from the more distant land has to bear a higher cost of transportation, and its cultivator must be reimbursed for this. The owner of the nearer land has an advantage which causes rent to rise.

The advantage due to situation is obviously less, the lower the cost of transportation. The cheapening of carriage in modern times has greatly diminished the importance of situation rent. This is strikingly the case for all agricultural produce—grain for example, which is easily transportable. Though refrigerating apparatus and fast freight facilities have made it possible to bring meat, fruit, vegetables, and milk from very distant sources of supply, the nearer lands still have some advantage from situation. If, indeed, the rates of transportation should be the same for all distances, the advantage would disappear. The railways which bring the milk to some of the large cities of the United States adopted at one time the practice of a "postage stamp rate"—that is, an even charge on all shipments, distance being disregarded. So far as they carried out this method, advantages of situation, and consequently economic rent resulting from situation, were done away with for milk farms. As it happened, public authority was appealed to by the owners of the nearer lands to prevent this practice, it being alleged that it was unreasonable and unjust to fix rates without regard to distance. The Interstate Commerce Commission sustained this contention and forbade the postage stamp rate; though *prima facie* it would seem to have been to the advantage of consumers, and not in violation of any sacred or inalienable right of the nearer producers.[1]

[1] The reader might well examine in this connection the issues which underlay the early Granger agitation, particularly in connection with "long and short haul" legislation.—EDITOR.

B. The Nature of Competition for the Use of Land

195. THE DIFFERENTIAL PRODUCTIVITY OF FARMERS[1]

By HENRY C. TAYLOR

According to the textbooks on political economy which are generally used in America today, rent varies in the same ratio as difference in productivity. By differences in productivity are usually meant differences in the value of the product of different farms of equal areas when cultivated with the same degree of intensity. It is apparently assumed that all farmers possess the same degree of efficiency, and that all land is cultivated with the same degree of intensity or else that variations in these respects do not make it necessary to modify the statement that differential rents are measured by differences in productivity. It is the purpose of this paper to consider the influence of variations in the efficiency of farmers and in the intensity of culture upon the amount of rent which will be paid for the use of land, and to point out that because of these variations differential rent cannot be measured in terms of differences in productivity.

The relative degree of prosperity to which the American farmer can attain is determined largely by his own efficiency. While the farmers who possess a relatively high degree of qualitative efficiency can win a larger return from land of any grade than can their less efficient competitors, this extra product due to superior ability is greater on the more productive than on the less productive land; and for this reason the more efficient farmers compete only for the more productive land, and pay more for it than the less efficient farmers can afford to pay. If, therefore, we measure differences in productivity in terms of the differences in the value of the products which the least efficient or marginal farmers could produce on the various grades of land under comparison, differential rents will be greater than differences in productivity. Inasmuch, however, as competition among the more efficient farmers for the more productive grades of land leads to a distribution of the land among the farmers in accordance with their efficiency—the most efficient farmers possessing the most productive and the least efficient the least productive land in use—the differences in the actual yield of the different grades of land are greater than the differences in the yield which any given farmer could produce; and, since the better farmers could win, and

[1] Adapted from the *Quarterly Journal of Economics*, XVII (1903), 598–604.

retain as personal profits, an extra product on the marginal land above what the marginal farmers can produce on such land, and must be allowed a profit equally large on the better land to keep them from outbidding the marginal farmers for marginal land and driving them out of the farming business, the differential rent will be less than the actual difference in the value of the product of the more productive and that of the marginal land.

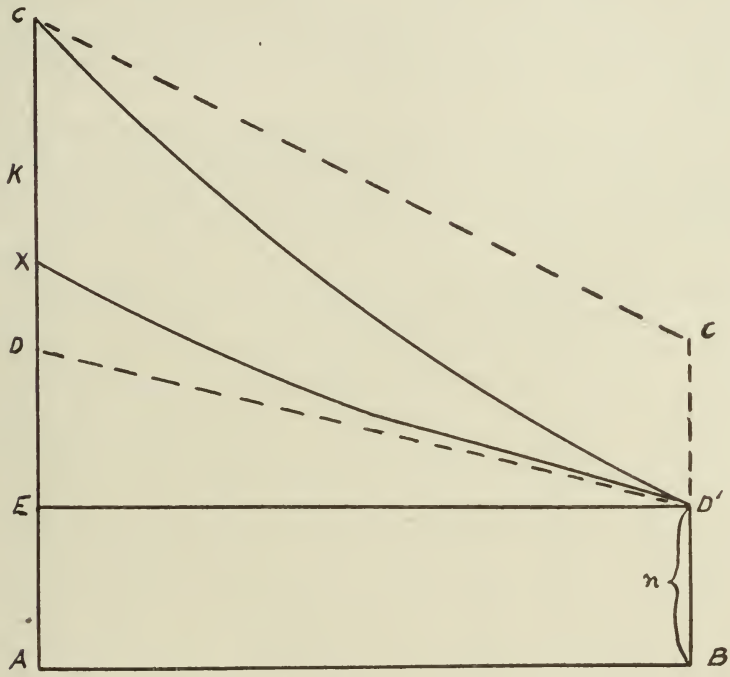


FIG. 1

Let us suppose that the land which is necessary to supply tne demand for a certain class of agricultural products, such, for example, as the products of the diversified agriculture of the corn belt, varies in productivity from A to B, that A grade land is twice as productive as B grade land, and that all other land under consideration is more productive than B and less productive than A grade land (see Fig. 1). Suppose, also, that all the farmers who are able to compete for the use of this land at a given time vary in efficiency from C to D (as represented in Fig. 1), that the farmer who has C degrees of efficiency

is qualitatively twice as efficient as the one who possesses D degrees of efficiency, and that the other farmers are graded according to their efficiency from C to D, as the land is graded from A to B. The farmer who possesses C degrees of efficiency can produce twice as much on land of any grade as the farmer with D degrees of efficiency. The D grade farmer is the marginal farmer, and must receive enough on marginal land to cover costs, including a living. On the A grade land, which is twice as productive as the marginal land, he can produce twice as much with the same outlay, and is willing to pay a differential rent for it equal to one-half the product.

Let us say that the D grade or marginal farmer's product on B grade land is valued at n (represented by line BD' in Fig. 1), that his product upon A grade land is valued at $2n$ (represented by line AD), and that he is willing to pay a differential rent of n (line ED) for the use of A grade land. Then the value of the product of the C grade farmer, who is qualitatively twice as efficient as the marginal farmer, will be $2n$ (line BC') on B grade land and $4n$ (line AC) on A grade land. Thus, while the C grade farmer can win an extra product valued at n (line $D'C'$) on B grade land, his extra product on A grade land, above what the D grade farmer could produce, is valued at $2n$ (line DC). Hence the C grade farmer will not compete for B grade land until the rent on A grade land rises sufficiently to absorb half of this extra product, so that his personal profit will be the same on both pieces of land. Until rent rises to $2n$ on A grade land (that is, to point K in Fig. 1, and measured by line EK), the personal profit which the C grade farmer can win on such land will be greater than that which he could win from B grade land. If the differential rent of A grade land should rise to $2n$ (that is, to point K), the C grade farmer's personal profit on A grade land (represented by line KC) would be the same as that which he could win on B grade land (represented by line $D'C'$), being valued at n in either case. But, while the C grade farmer will pay a rent of $2n$ for A grade land rather than farm marginal land, the D grade farmer will take marginal land rather than pay more than n for A grade land. With the given hypothesis the differential rent of A grade land will not be less than n (measured by line ED), for the D grade farmer can afford to pay that much for its use. It will not rise higher than $2n$ (measured by line EK), for the C grade farmer would then prefer marginal land, for which no economic rent is charged.

With all grades of farmers competing for the use of land, the differential rent of A grade land will be greater than n; for, at a rent of n, all but the marginal farmer will prefer it to inferior land, because the extra product, due to superior qualitative efficiency, is greater on the more productive land. Each farmer seeks to win the largest possible personal profit; and, as a result of competition for better land, rent will rise, until one by one the less efficient farmers find it preferable to take less productive land at a lower rent. The most efficient farmer can pay more for the best land than any of his competitors can afford to pay, and still receive a larger personal profit for his superior efficiency than he would receive from the less productive land at the lower rents which the less efficient farmers pay. Differential rents will, for this reason, be greater than the differences in productivity when we measure productivity in terms of the value of the product which the land will yield when farmed by the marginal farmer.

When each farmer has taken the land for which his degree of efficiency enables him to compete to best advantage, the marginal farmer will be found upon marginal land, the average farmer upon average land, and the most efficient farmer upon the most productive land. The product resulting from this most economical application of efficiency to productivity will be measured by the area $ACD'B$.

The line XD', which may be called the rent curve to distinguish it from the product curve CD', is drawn arbitrarily to illustrate the way in which rent will rise above line DD'. Point X will be some place between D and K, because, as has been shown, the differential rent of A grade land can neither be less than n nor more than $2n$. With continuous and regular gradation of land and of farmers this rent curve would be regular, but with irregular gradation of either factor it will be irregular. Thus the area EDD' (Fig. 1) represents the differential rent where all farmers have the same degree of efficiency as the marginal farmer, and the area DXD' represents the further differential which arises from variations in the efficiency of the farmers. These two constitute the differential rent which would be paid under the conditions laid down at the beginning of this discussion; namely, equal amounts of labor and capital on all grades of land and perfect competition.

The remainder of the surplus represented by area XCD' goes to the farmers as personal profits, the amount of personal profit received by a given farmer depending upon his relative degree of efficiency.

196. WHEN THE IMMIGRANT COMPETES FOR LAND[1]

By H. A. MILLIS

The influx of Japanese farmers into the Northwest has altered the terms upon which land is rented. Though all races are represented among the tenant farmers, and though the majority of the Italian gardeners lease the land they cultivate, the number of the white men coming to the several localities about Tacoma and Seattle and leasing land is smaller than formerly. There is in general among landowners an effective preference for the Japanese. They lease tracts of land and require little outlay on the part of the owner for houses and other improvements. In general they are more easily provided for than the members of the other races. Again, they more readily lease land and agree to reclaim part of it, though representatives of other races have made in the past and are now to a certain extent making such improvements for the landlord. Finally, the Japanese have been willing to pay more rent than the members of the various white races. Partly because of their strong desire to lease land the average cash rent per acre paid by them has greatly increased—from $13.15 per acre for land first leased to $20.63 per acre for that now leased. The tracts leased are not the same in many cases, but it is believed that the figures given exaggerate but slightly, if at all, the rise which has taken place. Leases are found about Bellevue and Vashon Island where Japanese competition for land in the one year 1907 caused the rents paid to rise from $20 to $30 or more per acre. In several cases it was found that they were willing to pay more for the land than were the white men.

The following instance is typical: Two white men were offered a 30-acre tract at $10 per acre on the condition that they would remove a few stumps from one part of it. They declined the offer, and a Japanese took the tract, paying $400 per year and agreeing to clear it also. Occasionally, landowners, because of race prejudice, refuse higher offers from Japanese and rent to white men at lower figures. Such instances are rather exceptional, however. More and more of the farms are being leased to the Japanese.

C. The Renting Contract

197. CONTRACT OR COMMERCIAL RENT VS. ECONOMIC RENT

It is evident that the lump sum which the farmer pays to his landlord includes, in almost all cases at least, a payment for the use of certain capital-goods as well as payment for the use of land. Separa-

[1] Adapted from *Reports of the Immigration Commission*, Vol. XXIV, p. 508.

tion of the two is, however, extremely difficult in the case of farming operations, though often quite obvious in connection with city property. The factory or store site renders no service save that of standing room; the building plays a technological part in the industrial process quite similar to that of any other part of the mechanical equipment. The land is frequently held by one owner and the building by another. Under these conditions it is easy to distinguish that part of the whole payment which is to be credited to land as ground rent and the part which is to be figured as interest upon the cost of the equipment (building, elevators, boilers, shafting, etc.) placed upon it. In the case of the farmer who rents bare land to till or pasture, such payment as he makes is, evidently, pure economic rent. If, on the other hand, this land has been capitalized with fences, wells, houses, barns, irrigation ditches, and the like, it is obvious that part of what he pays must go for the upkeep and depreciation of these capital-goods and to pay the owner for the use of the capital which he has tied up in these forms. If it be part of the renting contract that the landlord shall furnish teams, implements, seed, and perhaps even the family living, the element of interest in the so-called rent payment stands out clearly. At the other extreme, fertilizer, tile drains, and irrigation works become so thoroughly incorporated into the land and its productivity so inextricably bound up with their presence and operation that separation seems out of the question. As a result, we are practically forced to resort to the division used in law, and class together land and those things which are attached to it as fixtures, distinguishing this composite factor from capital-goods, which are movable.[1]

198. METHODS OF RENTING LAND IN IOWA[2]

By O. G. LLOYD

In general, there are two systems of renting in use in Iowa, cash and share. An important difference between them is that a larger proportion of capital is furnished and a larger risk is assumed by the cash tenant as compared with the share tenant.

[1] Certain modern economists attack this problem in a somewhat different way, by viewing the lump sum as a composite rent payment, consisting of the rent of land and the rents of the various capital-goods which are leased with it under the renting contract. This raises difficult issues as to the actual basis of income and capitalization which it seems wisest not to bring into a book of this character.—EDITOR.

[2] Adapted from *Bulletin 159*, Iowa Experiment Station, pp. 174–78.

Under these two general systems, four different methods of renting farms are followed, with modifications of each as a result of bargaining. In all the methods the landlord furnishes a house, a garden spot, and most of the permanent improvements. He makes the repairs of and the additions to the farm buildings and pays the taxes and insurance on all his property. On the other hand, the tenant generally furnishes all the labor, including work horses and machinery.

Stock-share renting.—In stock-share renting the net receipts are divided equally. Essentially, the landlord furnishes the land, the tenant the labor, and they own in common the live stock raised for profit. The most usual method is for the tenant to furnish one-half of the live stock raised for profit and all the labor, including the work horses and machinery necessary to operate the farm. Work horses are fed out of undivided feed and the landlord pays the service fee and obtains a half interest in the colts. The landlord pays all the taxes and insurance on the real estate and one-half of the taxes and insurance on the personal property held in common with the tenant. Although each furnishes one-half the capital used in the purchase of feed, live stock, etc., it is quite common for the landlord to advance all the money. In the dairy regions, where more intensive farming is practiced, the landlord often furnishes all the dairy herd, including the bull. Where horses are raised chiefly for sale, the landlord prefers a half interest in them, while in those regions where horses are kept chiefly for their work, the tenant owns the horses and he is either forbidden to raise colts or the landlord takes a half interest in them by paying part or all of the service fees.

The force of custom and the result of bargaining make many modifications in the contract, especially in the ownership of poultry and in the division of dairy, poultry and garden products.

The highest per cent of share-tenants is found on the cheaper soil areas of the southern and northeastern parts of the state. Renting on shares includes stock-share renting, and this form of leasing, although radically different from crop-share renting, was included as share-renting by the Bureau of the Census.

Cash renting.—In cash renting, a certain price per acre, or lump sum for the entire farm, is paid. As the tenant guarantees to pay the rent, regardless of the season, he assumes supervision of the farm and furnishes all the working capital necessary to operate it. Occasionally the landlord encourages the production of hay by furnishing grass seed, or he may furnish a manure spreader as an inducement to

the tenant to use the farm manure to the best advantage. Hay land is sometimes rented for two-thirds the price paid for grain land in order to encourage the keeping of live stock. The average cash rent is about $5 per acre. The landlord takes an interest in furnishing building material and repairs according to his desire to have live stock on the farm. The tenant usually hauls building material for permanent improvements and the tiles used in draining the farm. As a result of bargaining, many modifications are found.

Share-cash renting.—In share-cash renting, a certain price per acre or a lump sum is paid for hay and pasture land and a share of one-third to one-half of the crop is given for the use of the grain land. The share going to the landlord varies with the productivity of the land and the certainty of getting a crop. The landlord furnishes the real estate and most of the material and skilled labor used in making necessary improvements. He pays the taxes on his property and occasionally furnishes part or all of the grass seed. The tenant furnishes all the working capital and labor used in operating the farm and pays all operating expenses, including all of the twine and threshing bills. Owing to the heavy expenses of seed, twine, and threshing, the tenant generally pays a smaller share of the small grains than he does of corn. The contract usually calls for grain to be delivered at the nearest market, subject to the landlord's instructions.

Bushel renting.—In bushel renting, the tenant contracts to sell all his corn to the landlord at 15 cents per bushel. If the tenant furnishes all the working capital, the landlord agrees to pay him 20 cents per bushel for the corn. The tenant pays cash for a few acres of corn the landlord allows him for feed. In case the landlord permits him to raise any small grains, he pays one-half or two-thirds. Hay is seldom grown on bushel-rented farms. Where tenants furnish their own work horses they are compelled to erect most of the farm buildings themselves.

On bushel-rented farms the landlord is a cattle feeder and wants the grain from the farm for his live stock. A central farm operated by the owner is usually down in grass and it is used partly for pasture in summer and for feeding purposes during the winter. By having one set of buildings on the central farm, the landlord is able to economize labor and building material for the keeping of live stock. The landlord takes an active part in the supervision of the farm and often furnishes a large share of the working capital. He also advances credit to the tenant for living and operating expenses. While most

of the corn raised on bushel-rented farms is fed on the land belonging to the landlord, the corn is hauled off the farms where it is produced and fed on a central farm, where one set of buildings is used for keeping all the stock. Generally, the manure is not returned to the land that produced the corn, but is hauled out on the land near the feed lot.

199. TENANT SYSTEMS AT THE SOUTH

a) IN MISSISSIPPI[1]

By E. A. BOEGER[2]

Three general systems of renting land, with many variations, are practiced in the Yazoo-Mississippi Delta, each of the systems having advocates among planters and among tenants. On large plantations all three of the systems are sometimes found side by side. The main points of the three systems are described in the following paragraphs:

Half-and-half system (*share croppers*).—Under this system the tenant supplies the labor and one-half of the fertilizers, when any are used, while the landlord furnishes the land, a cabin, a garden plot, all the tools, the work animals and their feed, the seed, one-half of the fertilizers used, and the tenant's fuel wood, which the tenants cut from the nearest available woodland, using the landlord's mules for hauling. Each party under this system receives half the crop and each pays for his half of the ginning, bagging, and ties. If, as happens occasionally, another crop besides corn and cotton is grown, it is also divided equally between landlord and tenant. Cowpeas are frequently planted in the corn at the last cultivation with the seed usually furnished by the landlord. In this case all the hay, if cured, goes to the landlord. The tenant is often allowed to pasture it if he has a cow or other stock. The landlords exercise careful supervision over the share croppers, who are locally not considered as tenants at all, but as laborers hired to do the work in return for half the crop and the use of a cabin.

Sometimes under this system the tenant pays cash for the use of the land not planted in cotton and for the use of the planter's equipment in working it. In such cases the tenant receives all the crops raised in this manner.

Share renting system.—Under this system the tenant furnishes his own work stock and feeds it, and also supplies tools, seeds, and all labor, while the owner provides the land, the buildings, and the fuel.

[1] From *Bulletin 337, United States Department of Agriculture*, p. 6.

[2] E. A. Goldenweiser, joint author.

If fertilizers are used under this system, they are paid for in the ratio of each party's share of the crop. The tenant pays as rent a share of the crop, one-fourth in some sections and one-third in others. The use of the land in corn is sometimes paid for in cash and the tenant then retains all the crop. Each party to this agreement pays for ginning and bagging his part of the cotton. The landlord is interested in the crop and oversees the tenant's operations, but is not so much concerned about the economical use of mules and machinery, since they belong to the tenant.

Cash renting system.—This system is similar to the share renting system, except that in lieu of a share of the crop the tenant pays a fixed rent per acre in cash or in lint cotton. Since the cotton is sold through the planter, he is sure of his rent provided a crop is raised, but since he cannot collect his rent if there is no crop, and since also the tenant is usually indebted to him for supplies advanced, the landlord exercises supervision over the cash renters, except in the case of renters whom he knows to be dependable.

b) IN TEXAS[1]

By CHARLES B. AUSTIN

The kind of rent that is most common in the state of Texas is the rent known as the third and fourth, which means that the landlord furnishes nothing, or very little, in the way of teams or implements or working capital of any kind, and receives for the use of his land, houses, and barns one-third of the grain which is grown and one-fourth of the cotton. In case the tenant furnishes nothing except his labor, and all the capital is furnished by the land owner, the crops produced are usually divided equally. Cash rent is not paid in Texas so frequently as it is in other sections of the country, but it seems that cash rent is increasing in favor. Imitation and custom have been powerful forces in making the third and fourth rent almost universal. In the past few years, however, there has grown up the practice of either requiring, on the part of the land holder, or the offering, on the part of the tenant, some sort of a bonus in addition to the third and fourth for the use of the land. This bonus is either paid in cash or in other ways which will be discussed later on. We have information from certain communities where the bonus system began by the renters bidding against each other to acquire the more desirable places. It was quite natural that the land owners, finding out that

[1] Adapted from *Bulletin of the University of Texas*, 1915, No. 21, pp. 89–90.

certain renters were willing to pay something in addition to the third and fourth, soon began to demand the bonus, and there are now communities in which it would be difficult to place the responsibility for this bonus system. There has been recently a great deal of discussion concerning the iniquities of the bonus system. We shall not at this time enter into a discussion of the economic justness of the bonus, but devote our space to the words of the farmers who have written us concerning its payment.

Falls County.—Will say that at least 65 per cent pay a bonus in first one way or another. Some pay in the way of high prices for dead old stock, and old second-hand tools and wagons. They want to sell you a lot of high-priced stuff and rent to you, some the third all round, and some $1.00 per acre bonus for the privilege of letting you work clean land. This is mostly in the western part of Falls County, but sometimes it occurs in the mixed land, and in very rare cases it is the case in the sand. I myself have failed to get a place because I refused to pay standing rents. I personally know one man who pays $100 bonus on 117 acres, and has been [doing so] for three years. I know another man who has five rent houses and works all on halves and requires them to pay a blacksmith's bill, and give him half the cotton and all the feed. I have known him for seven years, and he has never had a vacant house.

Milam County.—The renters started the bonus in Texas themselves. I remember when the third and fourth was all the go and the renter thought he was paying too much, and he got the landowner to take money rent. Then the weevil came and the renter wanted the third and fourth again. He got it, then he began to pay a bonus to get the best homes and best land and matters got so tight for him he wanted to pass laws to stop the bonus, something he was to blame for himself. The tenants are to blame for most of their disasters. I know—for I have rented out land myself.

Navarro County.—Fabulous prices have been paid for teams all over the county in order to rent places. I have known men to sell their teams and buy from landlords in order to get places.

D. Land Values

200. THE CAPITALIZATION OF RENT[1]

By RICHARD T. ELY

To the individual who has a certain amount of money for which he is seeking the most profitable use, the question whether he shall invest it in land or other form of production goods is apt to be in itself

[1] Adapted from *Outlines of Economics*, pp. 359–60. (Copyright by The Macmillan Co.)

an unimportant one. If he chooses to buy land, it will be because he can get a satisfactory income from it, and he will very properly count the income as interest on the money he has invested in the land. If the income from the land increases, the selling value of the land will increase. From the point of view of our investor this will, of course, be an increase in the "capital value" of the land. It is important to note, however, that the land does not return an income simply because it is valuable. The process is the reverse of this. The land aids annually in the production of goods which command a price in the market; a part of the value of this annual product is imputed to the service of land and paid for in the form of economic rent; and the land is valued *because it commands a rent.* The value of the land is governed by its income-yielding power.

This fundamental fact is apt to escape our notice because in the United States lands are more commonly sold than rented, so that we think of the value of lands as the price at which they will sell, rather than their annual value, or rent, although the first kind of value is derived from the second. In England, where lands are more commonly rented, the value of land is usually thought of as its annual value or rent, while the selling value is often expressed as "twenty (or other number of) years' purchase," meaning twenty times the annual rent. The process by which the capacity to yield a certain annual income is made the basis for the determination of a certain selling price is termed "capitalization." In a country which is growing in population and wealth, and where land rents are consequently increasing, the selling value of land is apt to be somewhat greater than a capitalization of the amount of income it is yielding at the time of the sale would justify. This is because the ownership of land carries with it the right to receive future as well as present incomes, and the prospectively larger future incomes are taken into account in the process of capitalization. On the other hand, the durability of land, the variety of uses to which it may be put, and the social prestige attached to land ownership cause the rate of capitalization, that is, the ratio of income to selling value, to be lower in the case of land in old established communities than in the case of most forms of capital goods.

201. RENT RETURNS AND SPECULATION[1]

By O. G. LLOYD

Through a long series of years the productive value of land will about equal its market price. In other words, the cash rent will pay a time deposit rate on the market price of land and the share rent will pay a mortgage rate. The risk and trouble of collecting a time deposit is certainly no greater than collecting cash rent. The investment in farm mortgages and the collection of interest rates certainly afford no more risk and trouble than the supervision and collection of share rent.

Most Iowa farm owners hold land primarily for profit and not for sentimental reasons. If they believed they could make more money by selling their farms than by holding them, they would sell the farms. This question was asked more than 800 farmers: "If you believed you could make more money in the city than in the country, how many of you would sell your farms?" With but few exceptions, all said they would sell their farms if by so doing more money could be made.

If most of the Iowa farm owners believed land would not advance in price, they would sell at the market price and put the money on interest. They could get 4.1 per cent on time deposits or $5\frac{1}{2}$ per cent on farm mortgages at a time when cash rent is 2.30 per cent and share rent is 4.28 per cent. At present the land owners believe the advance in the price of land will make up the difference between the cash rent and the time deposit rate, or between the share rent and the farm mortgage rate of interest. They prefer to hold their land on this speculative basis rather than sell at the market price and put their money out on interest.

Proof that the element of risk is greater each year is shown in a decreasing cash rental rate, although the time deposit rate has remained about the same. For instance, according to reliable survey data, the cash rental rate for Iowa in 1910 was 2.76 per cent; in 1912 it had fallen to 2.30 per cent, while in 1913 it was less than 2.20 per cent. In other words, the land had advanced in price more rapidly than the rent, and the difference between the productive value of land and its market price was becoming larger and larger.

The question may be asked, "If the tenant is getting adequate returns, why is the per cent of tenancy increasing?"

[1] Adapted from *Bulletin 159, Iowa Experiment Station*, pp. 166–69.

There are many causes, but the principal one is speculation. According to the census, the price of Iowa farm land advanced 118 per cent from 1900 to 1910, or more than doubled in market price. Owners continue to hold land for the increase in price, regardless of the low rental value. It has been a common occurrence for land to pay less than 3 per cent on the investment and within a year's time advance 20 per cent in price. An exceptional case is known of a farm changing hands five times during the year. Although the rent was less than 3 per cent on the first sale price of $65.00 and no improvements were made during the year, the last sale price of the land was $135.00 per acre.

A rise in the price of land and an increase in the size of the farm business are two causes for an increase in tenant farms. When land rises in price so rapidly that the rent does not nearly pay a mortgage rate of interest, it is a question whether a tenant should attempt to buy land and pay the larger rate or remain a tenant until the two rates are more nearly equal.

Information concerning the amount of farm tenancy was first collected by the census in 1880. At that time 24 per cent, or less than one-fourth, of the Iowa farms were rented. In 1910, 37.8 per cent, or nearly two out of every five, were rented farms. While farms managed by owners and managers decreased in size and number from 1900 to 1910, tenant farms increased in size 16 acres and in number 2.9 per cent. Our data show that the highest per cent of tenancy is found on land that has risen most in price during the last ten years. Speculators who held the swamp lands of north-central Iowa as large stock ranches are now draining the land and dividing it into cultivated fields, which they rent to tenants. From $10 to $35 per acre has paid all expenses for tiling and outlet, and one year after draining, this black fertile soil has produced abundant yields of corn and oats and has continued to do so with only faint signs of depletion. This simple grain farming has required little supervision on the part of the landlord and has paid immediate returns in grain rent, besides promising a large advance in the price of land. This is the area where most leases contain a sale clause and many tenants shift from one farm to another every year. Land is not owned as a home, but as an investment, and the land is constantly on sale to the highest bidder. As a result, farms exchange hands frequently and the price of land is thereby artificially raised.

The difference in the market price and the productive value of land is more evident when rental and interest rates are compared. Tenants make adequate returns for the use of their labor and capital because they pay a rental rate which is little more than half the mortgage rate of interest. This rental rate enables them to make sufficient savings for the first payment on land, but if they were paying the mortgage rate as rental on the present market price of land they could not acquire ownership in a reasonable length of time.

This unhappy situation is not necessarily due to the present interest rates. If these rates were lowered they would likely cause an advance in the price of land. The difficulty lies in the capitalization of the anticipated rise in land values. People are very optimistic concerning the future price of farm land and have added part of the future value to the present price. This has caused land prices to advance more rapidly than rent and resulted in widening the gap between the market price of land and its productive value as measured in terms of the difference between the interest and rental rates.

If land were owned as a home and not as a speculative investment, the market price of land would more nearly equal its productive value and the rental rate would more nearly equal the mortgage rate of interest. The value of land would then depend on its annual producing power rather than on its probable advance in price. Land would be valued according to the capitalization of its rent and would be low enough in price to enable the farmer to pay for it from the annual earnings of the land.

Today the returns from the farm are divided equitably between the landlord and tenant and are sufficient to enable the tenant to acquire ownership of a farm in a reasonable length of time. The regrettable feature of the situation is the element of chance brought about by speculation, which could be abolished if more of the farmers regarded the farm as a permanent home, not only for the accumulation of capital, but as the best place to retire from active work.

202. THE INFLATION OF LAND PRICES[1]

In these days we hear much talk about "back to the land" and "forward to the land." The proponents of these movements show us with alarm the exhibit from the census presenting the facts that

[1] From *Report on Unemployment* by the Commission of Immigration and Housing of California, December, 1914, pp. 21–22.

during the decade 1900–1910, while our rural population increased by 34.5 per cent, the population in towns of 2,500 or more increased 81.4 per cent, or nearly two and one half times as rapidly. During this same decade, the number of farms increased 21.6 per cent against an increase of 60.1 per cent in the population; the total farm acreage, however, decreased. Perhaps there is some good ground for their alarm. Perhaps a different situation might prove a relief in this problem of unemployment. The relative unattractiveness of the land is shown particularly in the case of white foreign born. Though 24.2 per cent of our population in 1910, they formed 28.1 per cent of those living in towns and only 20.5 per cent of our rural population; and this in spite of the fact that most of our immigrants come from rural districts in Europe.

We believe that the cause of this phenomenon is to be sought in the unwarranted high price of agricultural land, too often based upon speculative valuation with no regard to its productivity, and upon the lack of organization among our farmers, leaving each to wage his battle for credit and markets alone and single-handed.

A few weeks ago, when several enthusiasts advocated bringing oppressed Belgians into this state, Mr. Gavin McNab, the proponent of the scheme, was quoted in the *San Francisco Bulletin* of October 21 as saying, "Too long the custom has been to place speculative values on the land in this state and thus prevent the taking up of certain sections by investors." In the same issue, Mr. A. S. Baldwin, of the firm of Baldwin & Howell, was quoted: "The main difficulty in work of this kind is that in colonization the land is figured so far in advance of its true value that the farmer is beset with troubles from the outset. There is too much greed among the landowners in most of these colonization projects. Also exorbitant commissions are paid for promotion, with the result that the settler finds himself saddled with the tremendous burdens."

Colonel Harris Weinstock, in an address delivered November 11 before the California State Fruit Growers' Convention at Los Angeles, said: "Great fortunes have been expended throughout the nation and elsewhere, inviting people to engage in California agriculture and horticulture, but our methods have been so crude and so unscientific and the love of greed on the part of land promoters has been such, that a very great proportion of those who have been induced to come here, and to buy our acreages, have failed, with great misfortune to themselves, and with serious injury to the state. Such persons have

been forced back to the cities, many of them as unskilled laborers, to swell the ranks of the casual unemployed, and many of them have cursed the state as a delusion and a snare, have shouted their misfortunes from the housetops, and have thus injured California in the eyes of their sympathizers here and elsewhere." Evidence of this sort could be cited *ad infinitum*.

There seems to be no one who would take the case against those who advocate making easier and more attractive the approach to the land. The farm is the natural outlet for our overcrowded cities. It is out of the rural districts that we must hope to get the backbone of our citizenry. Almost all proposed unemployment solutions that pretend to thoroughness look to the land for relief.

Assuming the desire to get on the land, along with the means and ability, the first requisite is a knowledge of available holdings. Today practically all information of this sort is compiled by railroads, chambers of commerce, boards of trade, or the promoters of some land project. These are naturally interested parties. There is nothing to show the prospective purchaser just how much and wherein he should discount their enthusiasm.

We should like to see a state land bureau, to supply at cost to prospective purchasers all needed information regarding the best economic uses of land, its value, approaches to market, and the like. It is more essential to start the settler right than to guide him after he may have taken up an almost impossible proposition. Closely related to the work of a state land bureau is a comprehensive land law that will make more difficult fraud and misrepresentation in the sale of rural lands, and that will bring to speedier justice the violators of the same, and give equity to the exploited. We have our regulation of weights and measures, and our pure food laws, but it is of vastly greater importance to the community as a whole that the prospective purchaser of farm lands be protected, both against exploitation and against his own ignorance. The enforcement of such a law might be given over to the proposed state land bureau.

203. CAUSES AFFECTING FARM VALUES[1]

By GEORGE K. HOLMES

Farm real estate in the United States has gained in value in such a degree since the census of 1900 that an examination of the causes of this gain may be not only interesting, but instructive, to the economic

[1] Adapted from *Yearbook of the Department of Agriculture*, 1905, pp. 511–21.

student as well as to the practical agriculturist. The highest percentage of increase, 40.3 per cent, was found in the South Central group of states, and close after that 40.2 per cent in the Western group. Third in order is the South Atlantic group, with 36 per cent, while a close fourth place is held by the North Central States with an increase of 35.3 per cent. The lowest increase of the five groups of states into which the country is divided in the census reports occurred in the North Atlantic states, where it is 13.5 per cent.

The rate of increase for cotton farms is highest—48.2 per cent. Second in order are the hay and grain farms, with an increase of 35 per cent; the live-stock farms increased in value per acre 34.3 per cent, and the farms devoted principally to sugar are found to have increased 33.2 per cent. Rice farming follows with an increase of 32.2 per cent in value per acre, while close to this is 32.1 per cent for tobacco farms. The farms having no special sources of income have an increase in value per acre amounting to 30.1 per cent, below which are the fruit farms with an increase of 27.9 per cent, the vegetable farms with 26.7 per cent, and, lowest of all, the dairy farms with an increase of 25.8 per cent.

EXPLANATIONS OF INCREASES

From every agricultural neighborhood in the United States explanations have been received of the increases and decreases in the real estate value per acre of medium farms during the last five years. Subject to some qualifications, the general principle is that the farm land itself has become more highly capitalized by a larger amount of net profit per acre. Only the main features of the analysis can be given in this article.

In the general matter of price of farm products farming had long been performed under disadvantages that were often discouraging until a few years ago. With now and then a year of exception in favor of this or the other crop it has been a general fact that prices of farm products, long previous to these recent years, have fallen too near the full economic cost of production, which is considerably larger than the immediate cost of production and includes many items generally overlooked by farmers. Indeed, it is quite certain that the prices have at times fallen below the full economic cost of production, of which the most conspicuous illustration was afforded seven years ago, when the price of cotton fell to $4\frac{1}{2}$ cents per pound, or even lower, at the plantation.

In 1905, at the end of the five-year period covered by this investigation, the prices of farm products have risen out of the depths to which various causes had previously sunk them, so that the farmer is at last getting a fair net return for his labor and farming operations in most products. This is naturally reflected in the higher capitalization of agricultural land. This conclusion is not advanced theoretically, but is amply sustained by the reports of many thousands of correspondents in all parts of the country and for all classes of farms for which there has been a considerable increase in price of products.

One can well realize how directly the availability of cheap public land suitable for farming has depressed the value of old agricultural land and kept from rising to its otherwise natural level the value of newer land taken into cultivation, upon reading the statements of many correspondents, particularly in the agricultural margin near the land recently acquired from nation, state, or railroad. The national land that can be utilized agriculturally is now reduced to about 300,000,000 acres, but nearly all of this is suitable only for grazing, since it cannot be used in dry farming nor under irrigation.

While the public land suitable for farming has been reaching exhaustion the flow of immigration from foreign countries and from the older parts of this country has been continuing in its direction, and where no farming land could be obtained from nation, state, or railroad the influx of agricultural people was halted in regions where farms had been established in more recent years, and the consequent pressure of new demand upon a fixed area increased the value per acre during the five years often as much as 50 to 100 per cent.

Along with the general causes that have elevated the price of farm land during the last five years should be mentioned the diminishing rate of interest. So great in the aggregate have been the savings of the farmers and persons in other occupations in the North Central states and in other sections that a large amount of these savings has sought investment in farms, even to the extent of raising farm value and diminishing the rate of interest, so that an advance of the price has followed often with no increased net profit per acre.

In the cotton belt the abolition of the crop lien in consequence of profitable prices of cotton has worked a greater economic revolution than has taken place in any other part of the country or for any crop ther than cotton. When the cotton planter ceased to pay an extremely high rate of interest for an advancement of supplies—estimated at 40 per cent fifteen years ago—and became able to sustain

his plantation with his own capital, as he did three years ago, and was often able to retain a large portion of his cotton for sale at a time when most to his own advantage, his land was at once converted into an economic stronghold and appreciated in value in a greater degree than the land devoted to any other large crop.

In the North Atlantic states, and in a less degree in other groups, there has been some back pressure upon the land from the cities. In some regions the old abandoned farms are becoming the country homes of city families, and are passing back into some sort of cultivation and production.

It would by no means be fair in the explanation of increase of farm values during the last five years to confine it to increases in price of products and to pressure of demand upon area. Very large effects have been derived from better cultural methods; from the substitution of profitable for unprofitable crops; by the adoption of more intensive culture and crop; by better applied labor; by larger and cheaper facilities for reaching markets; and by some improvements in the business features of marketing products. Each one of these causes is of large account and all together combine to make the net return per acre larger than it was five years ago by an amount sufficient to raise the capitalization of farm lands in a considerable degree.

The values embraced in this investigation include improved and new buildings and all improvements upon farms. In many cases correspondents have reported a large percentage of increase in farm values per acre where the increase was almost entirely due to added improvements in the way of better dwellings, new barns, improvements in old barns, new granaries, and new buildings for the protection of live stock in winter.

Throughout extensive areas there have been great additions to land values as the result of draining by tile and open ditches, and the latter are sometimes so large as to be called canals. Increases have resulted from the removal of the stumps of forest trees and the construction of new or better boundary fences. Better and more durable roads on the farm and between the farm and its market town or railroad station have had a distinct effect upon the farm values.

Along with numerous improvements, not all of which can be mentioned here, stands forth the improvement of the soil itself. There is a materially increased production of live stock, with the resultant

increased acreage of forage and grain crops which in rotation produce farm manures, humus, and rest; enrich the soil, as with nitrogen brought by legumes; and improve the mechanical condition of the soil for all crops. In regions needing commercial fertilizers, nitrogen, phosphorus, potash, and lime have been used more abundantly and more intelligently, and on crops bringing better prices.

FARMERS' NEW ECONOMIC INDEPENDENCE

A matter of great importance in its bearing upon the increased value of farm lands is the new economic independence of farmers, fundamentally growing out of their improved financial condition. Farmers now occupy a strong economic position, founded upon the tendency of the consumption of some important products to increase faster than population does, and upon the tendency of the desires for these products to increase faster than the production does, so that with respect to these products consumption is close upon the heels of production.

It may seem a matter of small consequence to mention poultry and eggs as an instance, but it should be remembered that the price of eggs has been high and growing higher for several years, because consumers have wanted more eggs than have been produced. Butter is another product that tends to underrun consumption. The highest-priced butter in the world in its home markets, taking first and fancy grades and ignoring specialties in other countries too small for notice, is found in this country. With regard to milk and cheese also the economic position has become stronger.

The annual products of dairying, of fruit and vegetable raising, and of poultry keeping aggregated nearly $2,000,000,000 in farmers' hands in 1905, or three-tenths of the gross value of all farm products; and these particular products belong to the class of those for which there is a tendency of demand to be greater than supply. In the case of none of these products is there a desired quantity satisfactory in quality obtainable by consumers at moderate prices. The public is underfed in the higher grades of these luxuries of the farm.

Meat animals, too, are establishing themselves in a stronger position in favor of the farmer, because of the tendency of population increase to outfoot the increase of these animals; but this statement, although true under natural conditions, may become subverted in its application to this country by the prohibitive legislation of importing countries.

In wheat production also the farmers of this country are in a position that is at least moderately strong. Canada and Argentina may stand in the way of a more advantageous position for a dozen years or so, but in the meantime the increasing demand of the world for wheat promises to the wheat grower that he shall not again suffer from the consequences of overproduction.

The foregoing lines of evidence converge upon the conclusion, which is now apparent in all parts of the United States, that in his new economic independence the farmer is now more than ever before free to choose his crop, and this is a matter of tremendous importance. This removes obstacles to the rotation of crops and to intensifying culture and methods. It gives the farmer ability to raise leguminous crops, with their important benefits to the soil. It enables him to multiply his domestic animals, with further consequences upon tillage and land fertility. It enables him to adapt himself to his best markets with the best crops.

The agricultural situation just indicated is very appreciably reflected by increased land and improvement values.

MINOR DECREASES IN VALUE

While the net result of changes in the average acre-values of farms in the last five years has been a marked increase for the whole country, decreases have been found within small areas, and these should not be lost to view in the grandeur of the counter-movement.

The migration of farmers' sons to town and city, to industry, trade, and transportation—a common fact especially apparent in the North Atlantic and North Central States—is throwing farms upon the market for sale, and this occurs sometimes in neighborhoods where there is no immigration and little, if any, local demand for farm lands. The unavoidable result is that in such neighborhoods farms have decreased and are still decreasing in value.

Probably no cause of depreciation of farm values is so frequently mentioned in nearly all parts of the country as the scarcity and deterioration of farm labor. The reports on which this statement is based generally refer to wage labor, but the scarcity is found, though less prevalently, in the supply of tenant labor also, particularly that of a trustworthy sort.

A cause of depression in farm values in many places in the North Atlantic states is the continuance of crop production which meets the

competition of the prairie farms. There is a considerable fraction of farmers who are "in a rut" and seem lacking in adaptability to new conditions of competition, and more particularly to new market conditions which have grown up around them and which are guaranteeing a profit to the producers of such crops as can be supplied directly by them to near-by consumers, or perhaps with small intervention by middlemen.

Another cause of decrease in farm values, but one that alternates with causes of increase, is unfavorable weather—too much or too little rain, devastating freshets, parching droughts, excessive or deficient sun heat, frosts that are too late in the spring or too early in the autumn, or severe winter freezes in a latitude not accustomed to them. Such unfavorable weather conditions depress the value of farm real estate, even though they have continued for no longer than one year; and when they have continued for two or three years the depression in values is extreme. In such cases there is an eventful recovery, sometimes promptly within a year and sometimes within a few years.

Some depressions in price have been in evidence during the five years under review. The tobacco crop in some of its varieties has suffered in this respect for several years and this in the face of stationary if not diminishing production. The owners of tobacco farms in some counties assert that the value of their lands has decreased within five years because the offers to buy tobacco have come solely or mostly from one buyer, who would take the crop only at his own price.

In the case of the extraordinarily large rice crop of 1904 also there was a diminished price which at once made itself felt in diminished land values as compared with those of the preceding year, although during the five-year period there was some increase.

The marked drop in the price of cotton in December, 1904, from which there was no full recovery until half a year after, diminished the aggregate value of cotton plantations and farms by many millions of dollars while the lower price continued. So it happens that farm land values are as sensitive to lower and low prices of products as they are to higher and high prices.

In preceding paragraphs are given the more frequently mentioned causes of depression in farm values during the last five years, but these causes are not generally prevalent and are often highly localized and specifically restricted.

204. VARIOUS FACTORS AFFECTING THE VALUE OF LAND[1]

By L. W. ELLIS

The mean average acre valuation of bare land for 21 Ohio farms studied by the United States Department of Agriculture is $45.96. For farm 1 the acre valuation of bare land is $61.62. For farm 2 it is $19.53. These are both dairy farms in the northeastern part of the state. Farm 1 is 1½ miles from town, on a stone pike, while farm 2 is 5 miles out, on a dirt road. Farm 4, with an acre valuation of $31.15, and farms 8, 9, and 10, with acre valuations of $87.74, $65.99, and $71, respectively, are all level farms. No. 4 needs considerable drainage. Nos. 8, 9, and 10 are well equipped with tile drains. Nos. 8 and 10 show high percentages (74 and 84.2, respectively) of land in crops, as compared with the mean average of 52.8 per cent for the 21 farms. Farm 25, with 91.9 per cent of land in tilled crops, and situated within a stone's throw of an interurban railway, shows a bare-land valuation of $40.10 per acre. This farm, however, lacks tile drainage and is overequipped with buildings as compared with other farms. Farm 3, with an acre valuation of $41.44, has a very expensive building equipment, and even when the latter is placed at a very low figure as compared with its cost it leaves a low figure for bare land. Farm 14, although the largest of all, with a total of 388.92 acres, has but 50.7 per cent of the land in crops. It contains, however, a large acreage of productive bottom land, has a low building investment per acre, and has good roads to a shipping point, so that the bare land has an acre valuation of $60 as compared with the average of $45.96 for the 21 farms. Farms 20, 21, 22, and 23, with bare-land valuations of $43.97, $22.26, $25.55, and $29.59, respectively, are all located in the hill section (southeastern part) of the state. No. 20 (valuation $43.97) shows an unusually low area in waste and timber land for a hill farm and is connected with town by 6 miles of pike road. No. 23 (valuation $29.59), with nearly the same area, distribution of acreage, and distance from railway station, is separated by 3 miles of hilly dirt road from the pike leading to town. No. 21 (valuation $22.26) has considerable waste and timber land. Farms 12 to 17, inclusive, range in bare-land value from $43.90 to $64.89; these farms are well equipped with buildings and are easily reached by pike roads from good towns. Most of them show a

[1] Adapted from "A Study of Farm Equipment in Ohio," *Bulletin 212, Bureau of Plant Industry, United States Department of Agriculture*, pp. 12–13.

higher percentage of crop land than the mean of the whole number and are in a high state of productivity. Farm 24, with a bare-land valuation of $19.61, is located in a rougher section in southern Ohio, is underequipped in buildings, and is conservatively valued rather than otherwise.

From these examples the land values due to good roads, good drainage, high percentage of crop areas, good topography, and adequate improvements can be plainly seen.

XII

LAND TENURE AND LAND POLICY

Introduction

Ever since the time when Lot's herdsmen quarreled with the herdsmen of Abraham for possession of the most favored portions of the plain of Jordan—and, doubtless, long before that—men have striven endlessly over the right to use land and to enjoy its benefits. The Gracchi found the land problem acute in Latium, but were unable to effect a solution of it. The feudal tenure of the Middle Ages was but a makeshift adjustment, suitable to the days of political turmoils. For a brief time it seemed that, in America, our ideals of liberty and equality were to attain, by the grace of free land, to a tolerably close approximation of economic as well as political democracy. But the early passing of the public domain which was supposed to be practically inexhaustible forces our generation to turn from the illusory hopes of yesterday to the stern necessity of making our rent usages and land laws such as shall secure the most effective utilization of a productive agency strictly limited in supply.

This "most effective utilization" means not merely tillage practices which are technically correct as applied to the land itself, but also such adjustments of the relations of human contract involved as shall secure the largest measure of co-operation on the part of labor and capital, and most intelligent direction of the whole productive process. The readings in Section A serve to indicate how intimate a relation maintains between the forms of tenure and the quality of agriculture. Another phase of the same matter might be illustrated by pointing out the minimum amount of agricultural utilization which is made of landed estates in England and of the country places of many American millionaires.

But, granted a satisfactory result in terms of production, what of the terms upon which this product shall be divided? It is not merely the formal question of rent, as discussed in our previous chapter, because most landlord-tenant relations involve the use of capital of various forms and the furnishing of supervision or even of labor by the one whom we speak of as only a *land*lord. The situation

resolves itself practically into a working partnership, and the success and permanence of the business depend upon arriving at a basis of division which shall induce both parties to put forth their best efforts and to work in harmony. Selection 210 indicates one method by which such team work has actually been achieved.

It is evident that the statistics of tenancy in the United States admit of various interpretations. In selection 211 Dr. Stewart illuminates an old discussion by reducing the figures to an acreage basis. Section C presents both complacent and alarmist views of farm tenancy, and Section D offers both radical and conservative plans of land reform.

A. Effects of Tenure on Farm Operation

205. THE RELATION OF TENURE TO THE QUALITY OF FARMING[1]

By O. R. JOHNSON[2]

A farm management survey of four townships in Johnson County, Missouri, indicated that owners and part owners kept more livestock on the land, than did tenants. The latter kept one animal unit for every $5\frac{1}{2}$ acres of crops, whereas the former kept one for each $4\frac{1}{2}$ acres. The effect of this difference upon the ultimate fertility of the land is evident. The matter may be viewed from another angle by studying the distribution of crops on the various classes of farms. Owners devote more land to pasture and meadow than do tenants. The tenant grows a half more corn than the landowner, nearly twice as much wheat, and about the same percentage of oats and hay. Wheat is the most important money crop of the region and is more popular with both part owners and tenants than it is with farm-owners.

Table IX shows the effect upon crop yields of the system of rental practiced in the region under consideration. Where a tenant can rent land for but one year at a time he must, of necessity, devote most of his attention to grain farming and he will consequently grow those crops which can be most readily turned into cash. This can lead to but one result—the result shown in Table IX. The tenant farms are much lower in yields. A difference of about 15 per cent in the yield of corn is noticed in tenant farms compared to farms operated by their owners with a somewhat smaller difference for wheat and a

[1] Adapted from *Bulletin 121, Missouri Experiment Station*, pp. 69–74.

[2] W. E. Foard, joint author.

difference of about one-third for oats. This illustrates the greatest evil of the present system of land tenure. The fact that a tenant has no assurance that he can remain on a farm for a longer period than one year is mainly responsible for the condition.

TABLE IX

THE EFFECT OF LAND TENURE UPON AVERAGE YIELDS

CROP	YIELDS		
	Owners	Part Owners	Tenants
Corn	38.3 bu.	36.3 bu.	32.9 bu.
Wheat	18.8 bu.	17.2 bu.	17.4 bu.
Oats	33.2 bu.	28.3 bu.	23.4 bu.
Cane	2.5 tons	2.4 tons	2.6 tons
Cowpea hay	1.15 tons	1.08 tons	.88 tons
Timothy	1.03 tons	1.01 tons	1.07 tons
Clover	1.00 tons	.97 tons	.91 tons
Mixed hay	1.11 tons	1.05 tons	1.16 tons

Again, with tenant farmers, one man handles considerably more land than in the other classes. Likewise he handles a greater acreage with each work horse. The owner keeps more equipment than any other class of farmers. With tenants especially this usually means that they do not have as much equipment as they should have for greatest efficiency. However, less equipment, coupled with a greater number of acres per man and horse, will naturally make the tenant's expenses considerably less than those of the other classes.

TABLE X

LABOR INCOMES ON FARMS OPERATED BY OWNERS, PART OWNERS, AND TENANTS

	272 OWNERS	218 PART OWNERS		179 TENANTS		AVERAGE OF 669 FARMS
		Landlord	Operator	Landlord	Operator	
Capital	$12,555	$3,940	$7,633	$8,378	$1,547	$11,531
Total receipts	1,800	247	1,763	494	1,200	1,841
Total expenditures	858	22	925	64	622	842
Farm income	942	225	838	430	578	999
Interest on investment	628	5.7%	382	5.13%	77	577
Labor income	314		456		501	422
Products used in home	167		172		144	163
Gross labor income	481		628		645	585
Family living	413		418		354	399
Farmer saves in addition to interest	68		210		291	186

Table X shows the comparative efficiency of the three classes of farm operators. The average labor income of a farm owner was

$314, that of the part owner $456, approximately 50 per cent larger, and that of the tenant $501, nearly 70 per cent larger than that of the landowner. The average labor income for the region is $422. Another interesting point in this connection is the fact that the man renting land to a landowner received 5.7 per cent on his investment while a man renting land to one who owns no land received only 5.1 per cent. This may be explained in two ways. The land rented to a part owner is usually nearly all tillable and is therefore all farmed. This would naturally be expected to return more than one rented where a portion of it is waste land, building block, etc. Another factor which might influence this difference is the fact that tenant land does not usually receive the care that land farmed by a landowner would receive. There would probably be some crops pastured down by an owner who has stock, while a tenant does not have such an opportunity.

Another point which should be mentioned here is the difference between labor income before products used in the home are credited to the farm and after these products are credited. A little more than one-third of the owner's actual income was in products which the farm furnished him. By "farm products" here is meant the vegetables, fruit, poultry, and dairy products and any meat furnished the household from the farm. To show what the operator actually receives from the farm, it would be necessary to add to this figure rent on the house. With these additions, it is shown that the owner receives a house to live in and $481 in actual value, while the part owner receives a house to live in and $628 in actual value, and the tenant a house and $645.

There is another factor which may be obtained from this calculation that is of as much or even more importance than labor income. This factor is obtained by deducting the cost of family living from the gross labor income mentioned above, which gives the actual number of dollars, in addition to interest on investment, which the operator has left at the end of the year for improvements of any kind, for investment, for giving his children a better education. According to Table X, the farm owner would have $696 for this purpose, the part owner $592, and the tenant $368, provided no mortgage interest had to be met. The average owner's mortgage is $880 and the average part owner's mortgage $920. Allowing 5 per cent interest on these mortgages, the owner would still have left $652 and the part owner $546. This gives a more accurate basis for judging the efficiency of

the different classes of farmers from the standpoint of citizenship, while labor income judges them from the standpoint of economic efficiency. A man who has $700 to spend in making his home modern or sending his children to college or in helping in rural betterment, must necessarily be a better and more desirable citizen than one who has half that amount.

206. A NATIONAL WASTE[1]

By W. D. BOYCE

During the next week the great national hegira, the flight of the unsatisfied renter for fields new and untried, begins and ends. This flight of the dissatisfied renter is one of the most costly follies of our great American unrest. The cost to the farming business of the country each year for this annual farm moving week mounts into the millions of dollars. And the pity of it all is that practically no one is the winner thereby; all parties to the transaction lose more than they win. The renter loses, the landlord loses, the general community and the nation at large lose.

Farming is a permanent business; it is no "fly by night" occupation. No man can start business on a farm without more expense and labor the first year than will be required to continue it on the same scale the second and each succeeding year. No man can pull up stakes and leave a farm at the close of the year without sacrificing the results of labor which he has done the past or preceding year and which he could not realize upon before the coming year—results which his successor will not be able to realize upon to anywhere near the extent which he himself could had he remained there. He loses without his successor gaining what he loses.

The renter who ends harvest knowing that he will move in the spring, will not do as good a job of hauling out manure and fall plowing as he would were he going to stay; nor does he take as good care of the buildings and other improvements. You cannot blame him; it is inherent human nature not to labor for another man's harvest; you would do the same thing if you were in his shoes. But the farm itself suffers through his lack of care for it. The landlord, the coming tenant, the community, and the nation at large suffer because of the depreciated productiveness of that farm; and no one gains thereby.

[1] An editorial in *The Farming Business*, February 26, 1916.

Our laws and customs of tenantry which even permit, let alone causing, such an extensive fluctuation in farm occupation each year are a serious national economic weakness. They are a brake on the wheels of farm progress, they are a dead load which the nation as a whole must bear without any rhyme or reason. It is mighty poor business, to say the least.

207. RESULTS UNDER DIFFERENT TYPES OF LEASE[1]

By O. G. LLOYD

Cash rented farms have the largest acreage, the highest value of work horses and tools per acre, and an amount of man labor per acre equal to that used on stock-share and share-cash rented farms. This combination is more profitable than that used on any other type of rented farms. It is probable that all leased farms, especially those rented for share-cash and by the bushel, would be more profitable if the business were larger, and if the size of the farm and the horse, tools, and man labor per acre were increased.

There is a conflict of interest between the share landlord and the share tenant with respect to the amount of horse, tools, and man labor that should be applied to each acre. The rent received by the share landlord varies with the amount of labor used on each acre. Double the labor per acre at the expense of the share tenant and the landlord's rent is increased while the tenant's expense may exceed the value of his share of the product. The cash tenant on the other hand applies labor liberally to each acre, since he gets the entire product before paying the rent, while the share tenant will stop before the cost of labor equals the value of his share instead of the total value of the product.

The most livestock is kept and the highest yields of corn are obtained on stock-share rented farms.

Better use is made of manure if handled by a manure spreader, and eight out of every ten stock-share rented farms have them while none is owned on the bushel-rented farms. When only about 16 per cent of the receipts come from the sale of crops, most of what is raised on the place is fed. This is what is done on stock-share farms, while on bushel-rented farms there were less than 7 animal units to every 100 acres, the yield of corn was 41 bushels per acre, and more than 92 per cent of the receipts were derived from the sale of grain.

[1] Adapted from *Bulletin 159, Iowa Experiment Station*, pp. 165, 179–84.

The group of tenants with five times the capital of the smallest capital group remained on the same farm nearly three times as long and made more than eight times the labor income. While "money makes money," one reason for its doing so is long tenure on the same farm. Ben Franklin's saying, "Two moves are as bad as a fire," is as true now as it was in his day.

The roaming farmer regards a large amount of capital as a positive hindrance to him, for at moving time he must either sell at a sacrifice or move at heavy expense.

Such a wanderer cannot hope to make a large labor income, for he lacks the work animals, tools, and productive livestock for successful farming. He cannot afford to seed clover or alfalfa or follow a cropping system which will maintain high yields, for he does not intend to stay long enough to reap the benefit of such work. He is a grain farmer who works hard during the summer but sells all his grain at harvest time and does very little until the following spring, except trade horses and do a few chores about the barn.

One reason for the shifting of tenants who have small capital is the fact that the majority of them are young men who wish larger farms as they accumulate sufficient capital and experience to operate a larger business. The stock-share method of renting enables the young tenant without adequate capital and mature experience to operate a large business from the beginning.

TABLE X

THE USE OF THE STOCK-SHARE METHOD OF RENTING SHOULD BE ENCOURAGED

Method of Renting	Age of Tenant	Age of Landlord	Per Cent of L. L.'s Who Live on Farm or in Adjoining Towns	Per Cent of L.L.'s Capital in Buildings	Farm Capital Except Land and Buildings
Stock-share	37	55	77.8	9.4	$6,433
Cash	42	60	57.1	6.1	5,240
Share-cash	41	52	68.8	6.1	2,726
Bushel	36	65	82.8	4.8	1,843
Average	39	56	71.9	7.6	5,133

Generally, landlords are middle aged men who live on the farm or in an adjoining town. If they take an active part in the supervision of the farm, they provide better farm buildings and more adequate capital for operating the farm.

While most tenants are young men, the average age of the tenants is raised by some aged men, who, through misfortune, are still renting land. At the average age of fifty-six years, the landlords are at the most productive period of their lives. As about three-fourths of them live on their rented farms or in an adjoining town, their capital and experience should be used. This can best be done under a system of renting which enables them to retain part of the supervision of the farm and share directly in the net profits. The stock-share method of renting is practical.

Farmers in some of the dairy counties in the northeastern part of the state estimate that from one-third to one-half of the rented farms in their counties are leased on the stock-share plan.

As the landlord takes an active part in the buying and selling, he should live near the farm. From a recent survey of 525 tenant farms, more than 17 out of every 20 landlords live within 12 miles of their farms, while 2 out of every 3 live on the rented farms or in adjoining towns. Between the ages of fifty and sixty the landlord is capable of managing the farm business as well or better than at any time in life. Having obtained his rich fund of experience and having lived so many years on the farm, he naturally wishes to keep in touch with the farm work, if someone will assume the responsibility of the manual labor.

Present economic conditions make the use of the stock-share method of renting a necessity. The advance in the price of land, the increase in the size of the farm, and the necessary equipment and labor properly to manage it require about $6,000, or more capital from the tenant than he unaided can furnish. The landlords are generally prepared to advance some credit to the tenant, but as they have little supervision of the farm business under the cash and share-cash plans, they do not wish to assume the risk of poor management, and the farm business is not so profitable. The stock-share landlord has an interest in the productive livestock, obtains one-half of the net receipts, and often advances all the money to buy the stock. Sometimes he takes the promissory note of the tenant for much of the working capital necessary properly to equip and operate the farm.

The average tenant between the ages of twenty-five and thirty-five years lacks the experience to manage such a large and intricate business. Yet, under the cash and share-cash methods he assumes most if not all the buying and selling, as well as the management of field work. The stock-share method enables the tenant to give most of

his time to production such as field work and feeding, etc., while the landlord can use his time in buying and selling, etc. Data taken from Iowa farms indicate that farm buildings on stock-share rented farms are the most used and are the most adequate for keeping livestock. Landlords generally are very slow in making permanent improvements if they have no assurance that the buildings will be used and proper care taken of them.

Besides encouraging the most profitable types of farming and maintaining the fertility of the soil, stock-share renting brings co-operative effort between landlord and tenant instead of working against each other. Every dollar made for the farm business is shared equally, and the advance of the interests of the one means prosperity for the other also. The "old people" are freed from the heavy labor of the farm and given liberty to come and go, yet by retaining some supervision of the farm its interests can be best conserved. The landlord associates freely with other men and has a greater opportunity to learn when, where, and what to buy and sell, is interested in the improvement of the farm, and is a booster and co-operator in the interest of the farm.

Two principal reasons for the success of stock-share renting are adequate capital and capable supervision furnished by the landlord. When the stock-share tenant accumulates adequate capital and experience so that the assistance of the landlord is no longer needed, it is to the interest of the tenant to rent for cash. In assuming more risk and supervision he acquires more liberty in equipping and managing the farm and obtains a large labor income.

B. Division of Income between Landlord and Tenant

208. LANDLORD'S RETURN IN RELATION TO TENANT'S LABOR INCOME[1]

By E. A. BOEGER[2]

A study of 878 records relating to the business of tenants on plantations in the Yazoo-Mississippi Delta, indicated that the landlord *is assured of a return of between 6 and 7 per cent on his investment where the land is operated by cash renters*, no matter what the yield or the tenant's labor income may be.

[1] Adapted from *Bulletin 337, United States Department of Agriculture*, pp. 12-13.

[2] E. A. Goldenweiser, joint author.

Where the land is worked by share croppers or share renters the landlord's rate of interest often falls below 6 per cent, but when the yield is good and the tenant makes a good return, the rate of interest sometimes rises to more than three times that amount.

It appears that the landlord can make better money, on the average, when he rents his land on some system of shares. The average rate of interest received by the landlord from share croppers was 13.6 per cent; from share renters, 11.8 per cent; and from cash renters, 6.6 per cent.

Table VIII shows the rate of interest received by landlords on their investment in farms whose tenants made each specified labor income. The chart shown on p. 657 (Fig. 3) shows the relationship graphically.

TABLE VIII

Class of Tenants	Labor Income							
	All Tenants	Deficit	Under $100	$100 to $299	$300 to $499	$500 to $699	$700 to $999	$1,000 and Over
	Number of Tenants in Each Labor Income Group							
All tenants	878	18	35	299	332	101	62	31
Share croppers	445	1	12	180	204	38	8	2
Share renters	136	4	7	41	48	18	14	4
Cash renters	297	13	16	78	80	45	40	25
	Average Rate of Interest on Landlord's Investment on Holdings of Tenants in Each Labor Income Group							
All tenants	10.6	7.0	5.5	8.2	12.7	13.2	9.6	10.2
Share croppers	13.6	1.1	3.1	8.7	15.5	19.8	18.2	25.7
Share renters	11.8	7.1	8.0	9.2	12.4	13.3	14.8	16.6
Cash renters	6.6	8.0	5.7	6.8	6.7	6.4	6.0	7.1

The landlord made only 1.1 per cent on his investment in the case of the share cropper who lost money and only 3.1 per cent where the tenant made under $100, but the rate increased rapidly with the tenant's labor income, and in the cases where the tenant made as much as $1,000, he gave the landlord a return of over 25 per cent on his investment. In case of the share renters the landlord in no group averaged less than 7.1 per cent and his rate of interest rose as high as 16.6 per cent where the tenant had a labor income as high as $1,000. In the case of cash renters the landlord's rate of interest varied within much narrower limits, the lowest being 5.7 per cent,

where the tenants made less than $100, and the highest, 8 per cent, where the tenants reported a deficit.

The variations in the rates of the landlords' interest are somewhat irregular owing to the small numbers involved, but in general it is clear that the landlord takes the greatest chances and, when successful, reaps the highest rewards from share croppers; with share renters the risks are less, and so are the possible rewards; while with cash renters the landlord takes a minimum risk and is assured of a return of 6 or 7 per cent on his investment, which is less than he would ordinarily receive for money loaned in this locality with land as security.

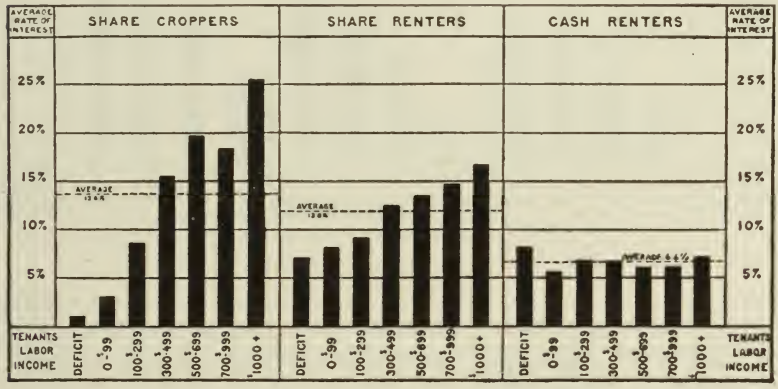


FIG. 3.—Rate of interest on landlords' investments in relation to tenants' labor income.

Where the yield of cotton was as much as a bale per acre the tenant made $624 for his labor and the landlord received 16.4 per cent on his investment, while where the yield was less than 0.6 of a bale the tenant had a labor income of $246 and the landlord made only 7 per cent on his money.

The labor income goes up with the yield of cotton for all classes of tenants, but the rise is least pronounced for share croppers and most pronounced for cash renters. Thus the labor income of a share cropper was not quite twice as great where the yield was a bale or more as where it was under 0.6 of a bale, while the labor income of a share renter was nearly four times as great, and that of a cash renter more than four and one-half times as great where the yield was high as where it was low.

The situation is reversed as regards the interest on the landlord's investment. The rate on share croppers' holdings was nearly three times as great where the yield was a bale or more as where it was

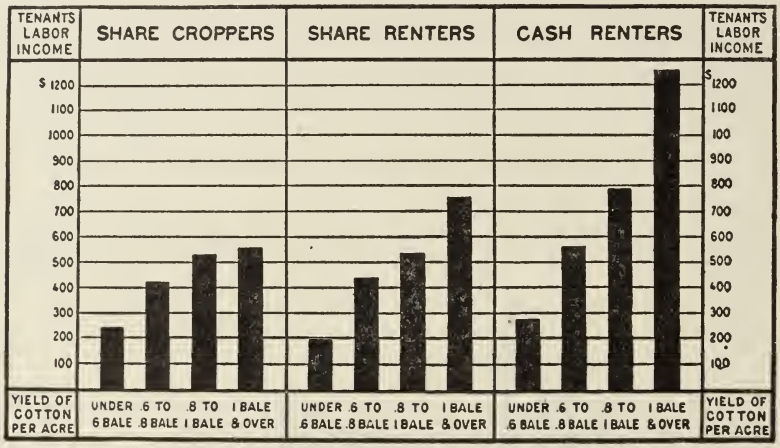


FIG. 4.—Tenants' labor income in relation to yield of cotton per acre

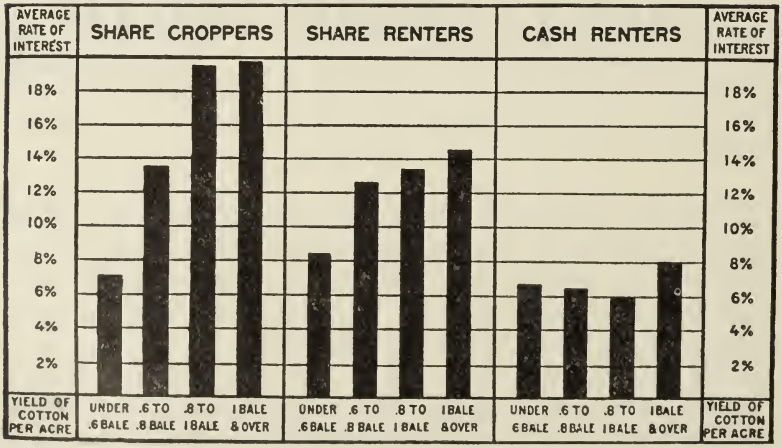


FIG. 5.—Rate of interest on landlords' investment in relation to yield of cotton per acre.

under 0.6 of a bale, on share renters' holdings it was one and three-fourths times as great and on cash renters' it was about one and one-fifth times as great. Thus the landlord gains a great deal more by

high yields in the case of share croppers than in the case of share or cash renters, and has a greater object in keeping close supervision over his share croppers.

209. COMPARATIVE INCOMES IN THE CORN BELT[1]

By E. H. THOMPSON[2]

A survey of 247 tenant farms in the corn belt indicated labor incomes of $870 for the farm operators, on the average of three districts. It rose as high as $1,139 in Illinois and fell as low as $716 in Iowa. The average labor income of 273 owners who worked their farms was $310 in Indiana, $622 in Illinois, and $291 in Iowa.

The 247 tenant farmers made an average labor income of $870 from an investment of less than $2,500. When it is remembered that the farm owners with over 12 times this investment made less than half the labor income of the tenants, the evidence is unmistakable that the man with small capital should rent rather than buy a farm. Of course the farm owner has a larger sum available for the family living, since, with an average capital of $30,606, he has $1,530 as well as his labor income of $408. If the farm owner is free of debt, as one-half of them are, he has $1,938 available for a living, as compared with the tenant's $992.

In addition to this sum available for a living, each has what the farm furnishes in the shape of produce. After the tenant pays his living and personal expenses out of this amount his savings cannot be large. If we allow the owners 3.5 per cent on their investment instead of 5 per cent they would then receive approximately the same labor income as the tenants ($870). This percentage is the same as that received by the landlords from the rented farms. Taking into consideration the results from all the farms managed by owners and by tenants, they show that a return can be expected of 3.5 per cent on the investment and a labor income of $870.

Seasonal variation and fluctuating prices have a marked influence on the profits from farming in the districts studied. The average price received for corn sold by the landlords of the 247 tenant farms was 41 cents, and a drop of 5 cents alone would have reduced the income 6 per cent.

Incomes received by landlords.—The farm, in the case of the landlord, is a business investment. He furnishes the capital, largely in

[1] Adapted from *Bulletin 41, United States Department of Agriculture*, pp. 9–13.

[2] H. M. Dixon, joint author.

the form of land, and the tenant furnishes the necessary labor and other means for its operation. The average investment of the 247 landlords for the three states studied was $25,210. The average net income on the capital invested was 3.5 per cent. All items of expense, including repairs, seeds, taxes, and insurance, were deducted before figuring the net returns. Table V gives the average capital, receipts, expenses, and returns for the landlords in each state.

TABLE V

AVERAGE CAPITAL, RECEIPTS, EXPENSES, AND PROFITS OF LANDLORDS FOR 247 FARMS OPERATED BY TENANTS

Item	Indiana (83 Farms)	Illinois (71 Farms)	Iowa (93 Farms)	Average (247 Farms)
Average area, acres.....	128	202	187	172
Average capital.....	$18,423	$36,479	$20,728	**$25,210**
Average receipts.....	1,002	1,538	1,014	1,185
Average expenses.....	351	213	354	306
Average farm income...	651	1,325	660	879
Average profit on investment, per cent*	3.53	3.64	3.19	3.5

* Obtained by dividing the farm income by the average capital.

The average return on investment from the farms in Illinois was 3.6 per cent, in Iowa 3.2 per cent, and in Indiana 3.5 per cent. The income is a moderate return on the large capital, considering the enormous rise in land values during the past ten years. In computing this income no credit has been allowed for the rise in value of real estate, except in case of actual improvements.

There has been a marked tendency throughout the entire country to consider the farm more and more as a business proposition. The landlord who is receiving 3.5 per cent net from his farm, with the bare land figured at $150 or more an acre, has a good, safe investment. It would seem from the results that if the year studied was a normal one, land in the corn belt is not overvalued. Changes in the price of the staple products, such as corn or oats, or material changes in the cost of production of these crops would be reflected in the price of farm land. Unless the price of corn becomes much higher for the next period of years, a pronounced increase in the value of land in this region cannot be expected.

The advisability of buying a farm as an investment with the intention of not living on it is often a perplexing question.

Variation in the profits of landlords.—Table VI gives the variation in the landlord's returns in the three states studied.

TABLE VI

VARIATION IN PROFITS OF LANDLORDS ON 247 TENANT FARMS IN INDIANA, ILLINOIS, AND IOWA

Landlord's Profit on Investment (Per Cent)	Number of Landlords	Percentage of Total Number	Landlord's Profit on Investment (Per Cent)	Number of Landlords	Percentage of Total Number
Less than 1....	6	2.4	4.1 to 5.....	42	17.0
1.1 to 2.....	20	8.1	5.1 to 6.....	13	5.3
2.1 to 3.....	75	30.4	6.1 to 7.....	7	2.8
3.1 to 4.....	78	31.6	7.1 to 8.....	6	2.4

Out of 247 men 6 received less than 1 per cent on their investments. The same number received between 7 and 8 per cent; none received over 8 per cent. It is clear that no phenomenal returns can be expected from capital put in farm land in those states at the present time. It is believed that the data in Table VI are a very good indication of the returns one may expect from a farm investment in those districts. The chances of making more than 5 per cent are about 1 in 10.

210. A LIBERAL STOCK-SHARE LEASE[1]

Date

Made this.....th day of February, A.D. 19...., by and between of..... County, Iowa, lessor, and.....of County, Iowa, lessee.

Description of Land.

WITNESSETH: That the said lessor has this day leased to said lessee, his heirs and assigns, the following land, to-wit:..... Acres.

Type of Farming.

This leasing arrangement is known as "Share Plan," and the premises to be used as grain, stock and dairy farm principally.

[1] From *Bulletin 159, Iowa Experiment Station.*

Length of Lease.

For the term of.....years, term commencing March 1st, 19...., and ending March 1st, 19...., on the following terms and conditions:

The Following Will Be Furnished and Shared by:

Both lessor and lessee taken together will be known by the firm name of....

Lessor.

Will furnish above described farm, including the improvements thereon, and material for needed repairs and improvements.

Lessee.

Will furnish all the machinery, tools, harness, and do all work and hire and pay all help necessary to properly care for the crops and stock on premises above described. Will also furnish coal for threshing, make all repairs and improvements where skilled labor is not required, and will haul all material to the farm and will board extra help. Lessee is to deliver to market all produce. All free of cost to lessor. Lessee also agrees to plant and care for one acre, or more, of potatoes. Can have reasonable amount of land for garden and potatoes, milk, poultry, and eggs for family use only.

Company.

..... & Co. will furnish all the livestock, consisting of horses, cattle, hogs and sheep. There shall be 20 cows or more kept on the farm. Will furnish poultry, seed grain, seed corn, grass seed, feed, salt, one separator and one manure spreader. Will pay service fees, taxes, insurance, expense of repairs to windmill and waterworks, also all expense of twine and threshing bill. For hauling milk and cream when not hauled by lessee. Milk and cream checks to be divided by purchaser. Each shall share equally in all the proceeds from the sale of stock, grain produce, etc., from the farm. The butter used by each to be taken out of their one-half. Proceeds from the sale of potatoes, poultry, eggs, all fruit on the farm to be half and half, each to gather their own share. All business of..... & Co. in the way of payments and receipt shall be through the..... Bank of.....

Noxious Weeds to Be Destroyed.

Lessee further covenants and agrees that he will farm said land in a good, farmlike and workmanlike manner; that he will commit no waste nor suffer injury to be done to the premises; that he will allow

no noxious weeds to go to seed on said premises, but will destroy the same, and will keep the weeds and grass cut in the roads adjoining the land.

Manure to Be Scattered Where Most Needed.

That he will draw out and scatter on said premises on or before December 1st of each year, where most needed, all manure being and made on said premises up to December 1st next preceding the end of the term, and that in default of so drawing out and scattering manure he will allow and pay to lessor as further rent the sum of $50.00 for each year that such default shall occur.

Acres to Be Left Plowed.

That he will leave as many acres plowed on said premises at the end of his term as he finds plowed when he takes possession, and in default of so doing he will pay to lessor $..... an acre for each acre short of such number.

Care of Premises.

That he will keep the buildings, fences and other improvements on said premises in as good repair and condition as the same are when he goes into possession, or as good as they may be put in during said term; that he will not assign his lease or sub-let any part of said premises without the written consent of lessor first had; that he will not bring mortgaged property on said premises without the consent of said lessor; that he will not sell or remove any of the crop from said premises without the consent of lessor.

Surrender Possession in Case of Default or at End of Lease.

That in case he shall, from any cause, neglect, refuse or be unable to properly prepare said land, sow, plant, cultivate, harvest or care for any and all crops to be raised on said land, said lessor, his agents, heirs or assigns, may at their option, upon twenty-four hours' notice to lessee, enter upon said premises and take possession thereof and of the crops growing or being thereon, and properly care for the same and sell the same, and the proceeds remaining after payment of the rents, cost and expense and damages shall go to lessee; that he will surrender possession of the stubble land, for the purpose of plowing, in the fall preceding the termination of this lease, as soon as the crop has been removed from the same; that he will surrender possession of said premises at the end of the term, or sooner termination thereof, and if immediate possession be not given, that he will pay lessor, or assigns, the sum of $10.00 for each and every day possession is thus withheld as liquidated damages for non-surrender.

Lien on Property of Lessee for Amount Due Lessor.

That a failure to keep and perform any of the agreements hereinbefore mentioned shall, at the option of said lessor, or assigns, operate as a forfeiture of this lease and terminate the term, and lessor may take possession of the premises at once without process of law, or he may bring an action at law for possession, said lessee being, from the date of such failure, a tenant holding over after the expiration of his term; that in consideration of this lease, and the agreements herein contained on the part of the lessor, said lessee covenants and agrees to pay said rent and keep and perform the agreements hereinbefore set forth, hereby covenanting that said rents as well as other moneys due from him to said lessor for plowing, or damages, or otherwise, shall be and hereby is declared and made a perpetual lien on any and all crops, stock and other personal property of lessee at any time kept, had or used on said premises, whether the same are exempt from execution or not, such lien to attach from the commencement of the term.

Lessor's Right of Entry at Any Time.

Said lessor reserves the right of himself, his employes or assigns to enter upon said premises at any time for the purpose of viewing the same or making repairs or improvements thereon, the same not to interfere with the occupancy of the lessee; and reserves the right to himself or agent to enter upon said premises for the purpose of plowing the stubble land, from which the crops shall have been removed in the fall preceding the termination of this lease.

How Division Shall Be Made at End of Lease.

At the end of the term of this lease an accounting shall be had between the respective parties hereto, and the produce, stock, etc., upon said farm belonging to..... & Co. shall be equally divided and if a proper settlement cannot be made in this way, all parties hereto agree to having a public sale on the premises for the purpose of dissolution. After all debts of & Co. and the expenses of having the sale are paid, the proceeds to be equally divided.

Liability of Each Party.

Neither party shall have the right to bind the other by any contract outside the scope of this agreement, or by any purchases made within the scope of this agreement except with the consent of the other.

Signed.....

C. The Problem of Farm Tenancy in the United States

211. THE TREND OF LAND TENURE IN THE UNITED STATES SINCE 1880[1]

By CHARLES L. STEWART

When the results of the tenth census were published, considerable surprise was evinced at the extent to which the farms of the nation were operated by tenants. Since that time, however, tenancy has become more and more prevalent in the country. The accompanying table summarizes the census data on the tenure of farms for the main geographic divisions.

TABLE I

PERCENTAGE OF FARMS OPERATED UNDER VARIOUS FORMS OF TENURE, UNITED STATES, 1880–1910*

	United States	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
Tenants										
1910	37.0	8.0	22.3	27.0	30.9	45.9	50.7	52.8	10.7	17.2
1900	35.3	9.4	25.3	26.3	29.6	44.2	48.1	49.1	12.2	19.7
1890	28.4	9.3	22.1	22.8	24.0	38.5	38.3	38.6	7.1	14.7
1880	25.6	8.5	19.2	20.5	20.5	36.1	36.8	35.2	7.4	16.8
Part owners†										
1910	9.3	3.1	5.5	11.7	16.1	6.4	6.9	7.6	8.6	10.9
1900	7.9	2.9	4.4	10.0	14.5	4.9	5.0	5.5	8.3	11.3
Managers										
1910	0.9	2.8	1.9	1.0	0.8	0.7	0.3	0.5	1.6	2.8
1900	1.0	2.5	1.7	1.0	0.8	0.9	0.5	0.7	3.4	2.9
Owners proper										
1910	52.7	86.1	70.3	60.3	52.3	46.9	42.1	39.1	79.1	69.1
1900	55.8	85.2	68.5	62.8	55.1	49.9	46.3	44.8	76.1	66.1

* Census, 1910, V, 122, 123.

† A "part owner" owns some of the land he operates, and rents additional land.

A comparison of the percentages of the various geographic divisions reveals a wider spread or range each successive decade. The percentage of tenant farms has moved higher most markedly where it was highest previously, and has shown least positiveness in increasing where it was already low. Taken as a whole, the increase in prevalence of tenant farming has been persistent, although not very rapid.

The farms operated by part owners and managers were doubtless classified with those of owners proper in 1880 and 1890. So far as the managed farms are concerned, the error involved in counting

[1] Adapted from "Tenant Farming in the United States, with Special Reference to Illinois," *University of Illinois Studies in the Social Sciences*, Vol. V, No. 3, pp. 12–18. (Copyright by the University of Illinois.)

them in with the farms operated by owners is not great. There was no section in which managed farms constituted more than 3 per cent of all farms in 1910. For some purposes it is desirable to regard the farms of part owners as not essentially different from the farms of owners proper. In 1900 the farms of part owners contained, on the average, nearly 5 acres more of owned land than the average farm entirely owned by the operator. The part owners constituted 9.3 per cent of all farm operators in 1910.

The tenure statistics based on farms afford a good idea of the numbers of the various kinds of operators. Tenure data based on acreage, however, give some slightly different impressions. The cause of the variations is the fact that farms differ in size between various tenures and sections.

The average acreage of all farms declined from 146.2 in 1900 to 138.1 in 1910. Only the farms of the North Central states showed a tendency to increase in size. The divisions where small farms prevailed in 1900 underwent a still further reduction in the size of operating units by 1910.

In the northeast quarter of the country and in the Mountain and Pacific divisions, on the other hand, the size of tenant farms was greater than that of the farms operated by the owners. As a rule, however, the tenants operated farms less than two-thirds as large as those operated by the owners. In the South Central states the tenant farms were between a third and a half as large, on the average, as the farms of owners.

The farms of part owners were approximately twice as large as those of owners proper in 1900, but fell off nearly 20 per cent by 1910, while the farms of owners proper underwent a slight increase during that period. The enormous farms of managers were in the territory west of the Mississippi River, where the farms of all tenures, except tenants in the West South Central states, were much above the general average in size.

On the basis of farms, tenancy was most marked in the Southern states. The number of tenant farms and the percentage of farms operated by tenants in the states of those divisions has been so great and increasing so rapidly as to give more or less alarm to some students of the situation. When, however, the statistics of tenure are placed on the basis of acreage, as in the second table, the percentage of tenancy in the South loses much of its alarming magnitude. This is due to the small size of the tenant farms in that region. The social

significance of tenancy in the South is not minimized, however, but rather augmented by the fact that great numbers of tenants operate small farms. On the basis of acreage the East North Central division is nearly abreast with the South Atlantic division in the percentage of tenancy, while the West North Central states stand between the East and West South Central groups. On the whole, the percentages of tenancy are much more nearly uniform in the various divisions when the statistics are based upon acreage than when based upon farms.

TABLE II

PERCENTAGE OF FARM ACREAGE OPERATED UNDER VARIOUS FORMS OF TENURE, UNITED STATES, 1900–1910*

	United States	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
Tenants										
1910	25.8	7.8	25.9	30.0	27.0	30.1	27.9	26.7	10.6	19.8
1900	23.3	9.4	28.6	27.3	23.6	30.6	27.4	19.0	9 4	19.5
Part owners										
1910	15.2	4.2	7.4	13.9	23.9	6.3	8.0	13.8	16.7	21.7
1900	14.9	4.2	5.9	11.7	23.7	4.7	5.8	17 7	22.0	19.6
Rented by part owners										
1910	7.4	1.6	2.1	6.2	11.5	2.4	2.7	6.4	8.9	1.1
1900	7.1	1.6	1.6	5.2	11.4	1.8	2.0	8.2	12.5	1 0
Owned by part owners										
1910	7.8	2.6	5.3	7.7	12.4	3.9	5.3	7.4	7.8	20.6
1900	7.8	2.6	4.3	6.5	12.3	2.9	3.8	9.5	9.5	18.6
Owners proper										
1910	52.9	82.5	62.7	4.1	47.0	60.4	52.1	47.9	53.2	43.1
1900	51.4	82.5	62.2	59.0	49.4	61.4	64.8	37.1	33.0	42.9
Managers				5						
1910	6.1	5.5	4.0	2.0	2.1	3.2	2.0	11.6	18.5	15.4
1900	10.4	3.9	3.3	2.0	3.3	3.3	2.0	26.2	35.6	18.0
All lessees										
1910	33.2	9.4	28.0	6.2	38.5	32.5	30.6	33.1	19.5	20.9
1900	30.4	11.0	30.2	32.5	35.0	32.4	29.4	27.2	21.9	20.5
All deed-holders				3						
1910	60.7	85.1	68.0	1.8	59.4	64.3	67.4	55.3	62.0	63.7
1900	59.2	85.1	66.5	65.5	61.7	64.3	68.6	46.6	42.5	61.5
				6						

* Census, 1900, V, 308; 1910, V, 114.

Because of the large size of their farms, the proportion of farm land operated by part owners and by managers is much larger than the number of such operators would indicate. In 1910 the part owners operated three-fifths as much farm land as the tenants. They hired nearly half of this land. Counting both the land hired by part owners and the land hired by tenants, the data indicate that in 1910 the leasing of farm land was most prevalent in the North Central states.[1]

[1] The individual states in which the percentages of farm land operated under lease were highest are as follows: in 1900, Delaware, 59.5; Illinois, 45 2; and Maryland, 43.2; in 1910, Oklahoma, 63.1; Delaware, 52.8; and Illinois, 51.0.

The percentage of farm land leased in the United States in both 1900 and 1910 was smaller than indicated by the data based on the number of tenant farms. On the other hand, while there was only a slight increase in the percentage of farms operated by tenants between 1900 and 1910, the proportion of the farm *area* operated under lease was considerably greater in 1910 than in 1900.

Managers controlled 6.1 per cent of the farm land in the United States in 1910. In the West South Central and Mountain divisions they operated between 10 and 20 per cent of the land.

In nearly all discussions of land tenure in the United States, only the statistics on farms operated by tenants have been employed, and the reader naturally supposes that the farms which are not operated by tenants are cultivated by their owners. The data on the percentage of farms operated by tenants suggest that (1) owners operated a smaller part of the land in the Southern states than in any other division of the country; that (2) the farms of the Mountain and Pacific states were almost exclusively in the hands of owners; and that (3) operation of farms by owners was declining between 1900 and 1910. Each of these three contentions must be modified or rejected when the statistics of acreage are examined. Outside of the New England and Middle Atlantic states, operation of land by owners was most prevalent in the East South Central and South Atlantic states. Ownership was least common in the West South Central and West North Central groups. In the territory east of the Mississippi River, ownership was less prevalent in the (East) North Central states than in any other division.

Operation by owners, while shown by the data based on acreage to be smaller than might be inferred from the more commonly quoted data based on farms, was more prevalent in the country as a whole in 1910 than in 1900. It appears, therefore, that while the trend in the tenure of farms was somewhat toward tenancy, the trend in the tenure of farm land was toward a relative increase of both the lease and the owned acreage at the expense of the acreage controlled by managers. This was true especially in the West South Central, Mountain, and Pacific divisions. In the Middle Atlantic states the trend was toward ownership because of the decline in the percentage of farms run by tenants. In the North Central states, however, both east and west of the Mississippi River, and in the East South Central states, the trend was toward land leasing and away from operation by the owners.

Mortgage encumbrance on owned land.—Although approximately 6 out of 10 acres are operated by the owners in the United States, in many cases the nominal owners hold only an equity in the land. Statistics on farm mortgages were gathered in 1890, 1900, and 1910. They related only to farm land operated by the owners, the part owners in most cases having limited their reports to the land owned by them.

The percentage free from mortgage in the United States declined from 71.8 in 1890 to 66.4 in 1910. The percentage of farms operated by owners under mortgage in 1910 was greater in the West North Central group of states than in any other division, although that division was the only one in which there was a decline from the percentage prevailing in 1890. The district having the highest percentage of farms operated by owners encumbered east of the Mississippi was the East North Central division. Mortgaging of farms operated by owners appears to have been least common in the Southern states, although compared with the percentages prevailing in 1890 in those divisions the practice appears to have been growing with remarkable rapidity.

Outside of the two North Central groups, there appears to be no correlation between the percentage of land leased and the extent to which the owned land is mortgaged. In those divisions, however, we find both the highest percentage of the farm land operated under lease and the highest percentage of the remainder of the farm land owned under mortgage.

In all sections of the country there was a decline in the ratio of debt to value of farm property between 1890 and 1900. The equity increased from 64.5 per cent in 1890 to 72.7 per cent in 1910. This was in spite of the increase of 40.1 per cent in the amount of indebtedness on the average American farm between the two dates. The amount of equity increased 106.0 per cent. It seems, therefore, that the rise in the value of mortgaged farms was so great that the increase in mortgage debt could not keep up with it. This was less true of New England and the Middle Atlantic states than of the remainder of the country. The proportion of the value of mortgaged farms covered by mortgage was highest in those divisions in 1910.

To summarize, in 1910 in the United States as a whole 33.2 per cent of the farm acreage was operated under lease, 6.1 by salaried managers, about 20.4 by owners under mortgage—the mortgage

indebtedness representing 27.3 per cent of the value of the farms. Only about 40 per cent of the farm land was operated by owners clear of mortgage encumbrance.

212. THE BRIGHT SIDE OF TENANCY STATISTICS[1]

By ERNEST LUDLOW BOGART

The rise in the percentage of farm tenancy in the United States from 25.5 in 1880 to 28.4 in 1890 and 35.3 in 1900 has caused fear to be expressed on every hand, that our democratic conditions of land ownership are disappearing, and that methods of large-scale production in agriculture are crushing out the small independent farmer. It has been taken for granted generally that the increase of tenants was at the expense of owners and that such a tendency indicated movement toward Old World conditions of land tenure. Such alarmist statements rest upon a superficial analysis of the facts, and, properly interpreted, the statistics of farm tenure in the United States evidence a very healthy development and give bright promise for the future.

Turning to the facts in the matter, we find that of every 1,000 males engaged in agriculture the distribution was as follows:

Year	Owners	Tenants	Persons Not Owners or Tenants
1880.....	422	145	433
1890.....	420	166	414
1900.....	423	231	346

This third group comprises the male members of the farmer's family and his hired laborers. The gain in the number of farm tenants has evidently been due to the large number of recruits from the class of farm laborers and farmers' sons, rather than to a decline in farm owners. Again, in each decade since 1870 the increase in the number of farms has been more rapid than that of the male population engaged in agriculture. Since the farms have increased faster than the rural population, the increased number of farm operators must have been drawn from the agricultural population itself and not from outside sources. Now the only class not already operating farms who could take up the new farms are the laborers or young men. So we

[1] Adapted from *Journal of Political Economy*, XVI (April, 1908), 201–3, 11.

see that a constantly increasing proportion of those country boys who remain at home improve their condition by taking up farms.

These facts are still more clearly brought out by considering the distribution of the three classes of the rural population in the different age groups. Thus in the age group ten to twenty-five, over 92 per cent of all were children or laborers ("others"); and in the age group sixty-five and over, more than 80 per cent were owners. So far, therefore, from the conditions of farm tenure becoming less democratic in the last fifty years, they have steadily improved. There is today a healthy progress upward in the steady advancement of the wage laborers and children of farmers, first to tenancy and finally, with advancing age and ability and accumulated capital, to farm ownership.

Another consideration also may be urged in substantiation of the belief that the real tendency of farm tenure is toward ultimate ownership rather than tenantry. As the country grows in population and develops, agriculture will necessarily become more intensive, as it is already in the East. Now it is precisely in those farms which are used for the most intensive cultivation, such as those for flowers and plants, for fruits, and for dairy products, that ownership is most prevalent—in each of these cases over three-fourths of the farms being owned—while in extensive culture, as hay and grain, the proportion of rented farms is greatest.

Nor does the existence of mortgage indebtedness warrant any gloomy foreboding; taken in connection with the other facts it must be held to represent the struggle of the farmer tenant to purchase an equity in the farm he tills, or of the small owner to provide himself with the necessary capital for improvements. As a result of the prosperity of the last few years, the farmers have been paying off these debts, and are today probably in a stronger position than at any earlier time in our history.

213. FOREBODINGS FOR THE FUTURE[1]

By PHILIP R. KELLAR

It may seem to many to be a far cry from the farm tenure problem of Great Britain to the farm tenure problem of the United States. Americans as a rule will look upon Chancellor David Lloyd-George's campaign "to free British land from landlordism and to get the people

[1] Adapted from the *Forum*, LII (July, 1914), 81–88. (Copyright by Mitchell Kennerley.)

back on it," because the landholding system there is a "ghastly failure," as a campaign of exclusive interest to Britons, and as having little if any bearing upon the course of affairs in the United States.

But the conditions in Britain suggest what the conditions in America may be in the course of not so many years if present tendencies are permitted to go on unchecked or undiverted. That the time is come for earnest consideration of European experience is amply proved by the trend from farm owner to farm tenant in the United States, which is accompanying the trend from farm to city, and is clearly indicated by the figures of the last census. In ten years the number of American tenant farmers increased by 329,712, or 16.2 per cent, while the number of farmers operating land owned by them increased by only 295,399, or 8.1 per cent. Even today there are nearly two and one-half million farmers in America who rent the lands they cultivate, as compared with four million farmers who own their farms. Should the relative rate of increase continue for another ten years, the actual increase in number of tenant farmers would be nearly 50,000 greater than that of farmer-owners.

With two and one-half million tenant farmers America already has a bigger problem, in point of numbers, than has Great Britain. The problem is not so serious yet, largely because of the area of the United States and the newness of our agricultural development, but it is serious enough to command careful attention. The unsolved farm land tenure problem in the United States is largely responsible for the annual migration into Western Canada of hundreds of thousands of good American farmer citizens. One man from central Ohio had been making for the landlord as much as $9 per acre per year on a 170-acre farm, and the result was that the owner valued the land upon the basis of a $9 annual income, which is a little better than 5 per cent on $175. The more profit he made the farm yield, the greater became the share that the owner received, and the higher he placed the value of his land, and the farther out of the reach of the tenant's purchasing power the land went.

In time the farm tenure problem will become as acute in the United States as it is in the British Isles. Perhaps in the future we shall have laws limiting the area of farm lands which one man may own, and fixing the terms upon which he shall rent it. At present, however, we have two and one-half million tenant farmers and five million tenantless, uncultivated, unplatted farms. They should be brought together.

214. WHEN TENANT FARMING IS DESIRABLE[1]

By J. W. FROLEY[2]

Speaking generally, tenant farming is not a type to be encouraged in America. Nevertheless, tenant farming is here. It is a fact. There is, besides, a place for tenant farming in American agriculture. Cheap, fertile farms are largely a matter of the past. The homesteads of the West are practically gone. If a young man desires to go into farming in these days, he requires considerable capital. It takes a long time, working out by the day or month, to acquire that capital, and good land is expensive. If he wishes to buy a farm, it usually takes all the money and credit at his command to buy the land alone.

The acquisition of the land is only the beginning of the struggle. Investigations have shown that in farming only about half the capital required is invested in the land. The remainder is invested in buildings, fences, farm machinery, tools, and live stock, sufficient cash being kept on hand for running expenses. Many a man buying a farm will put all his money into the land and then struggle the remainder of his life with insufficient working capital, trying to meet expenses and make the farm earn its equipment. A mere existence rather than a living is too often the result.

Should the same man let someone else furnish the farm and put his own money into the working and proper handling of it he would require much less capital. He would be relieved of a large burden of debt, and with adequate equipment and cash on hand the farm would be run far more efficiently and, generally, to his greater profit.

There is a place, then, in our present agricultural system for tenant farming. A man who has acquired some money, as a laborer or otherwise, who desires to be independent but who has not sufficient money or credit to buy and efficiently equip a complete farm, may let someone else furnish the farm while he furnishes the labor and part or all of the equipment and other working capital. Whether the results of such an arrangement are mutually satisfactory depends upon the establishment of a system of renting which shall provide for a cropping and fertilizing practice which will produce satisfactory returns in the present but also safeguard the future fertility of the farm. The terms of the lease must also be such as to secure a fair division of returns between the owner and the renter, and give the tenant a permanent attachment to and interest in the farm he works.

[1] Adapted from *Farmers' Bulletin 437*, pp. 4–5.

[2] C. Beaman Smith, joint author.

D. Land Policy and Land Reform

215. THE EFFECTS OF OUR PUBLIC LAND POLICY[1]

By BENJAMIN H. HIBBARD

In looking back over the history of the United States land policies what judgment is to be passed upon them? As a means of deriving a federal revenue the failure has been complete, since more money has been paid out than has been received in connection with the public domain. The next main plan was to put the land into the hands of those who needed it and who would use it. This idea came to permeate the views of many congressmen a hundred years ago, and after some forty years of struggle and debate the principle was put into complete practice so far as the Homestead law was applicable. There were in Congress and in the administrative offices a number of men throughout the long period of debate who wished sincerely to devise means of holding the land out of the clutches of speculators and secure it to settlers. This policy requires clearer vision for its realization than any number of these leaders had. To put land into the hands of settlers was no guarantee that it would stay there. The preemption laws prescribed settlement and improvement only till such time as payment should be made, after which the land could be disposed of at will. The Homestead law was, and is, the outstanding example of land given to settlers in such a manner as to compel its retention for a considerable time by the settler. And this was for but five years. Where the law was rigidly enforced it was difficult for a man to get hold of more than 160 acres of land under the *Homestead Act*, but it was not difficult, by collusion, to hire men to homestead for the owner of a herd of cattle and so keep the strategic points in the hands of a few men. Or it was not even necessary to resort to illegal means. The man interested in holding a big tract of land was in a multitude of instances able to do so by buying out the homesteader who was fortunate enough to get hold of the desirable tracts from the settler's standpoint. This sort of thing did not, and could not, take place where most of the land was desirable for agricultural purposes. The worst feature of the Homestead law was its extension over land not adapted to it. It was designed for the western part of the humid belt of prairie land and by no means for the arid and the forested regions, yet many a useless homestead was

[1] Adapted from *Monthly Bulletin of Economic and Social Intelligence* (International Institute of Agriculture), January, 1916, pp. 115–17.

taken in the arid sections, and many a quarter-section of land valuable for timber only was secured through the farce of homestead requirements.

Speculation ran riot because there was no way devised for holding it in check and because great tracts of land at a low price are always tempting to the man with money to invest. Not many great estates were formed out of this cheap land. It was nearly always the purpose of the speculator to sell within a short time. Since the buying of great holdings was largely several years in advance of settlement and no small part of it in boom years such as 1835 and 1836, and again just preceding 1857, the speculator was in the majority of instances disappointed. He sold out for what he could get, and few fortunes were made. Nevertheless, the process resulted in making the settler who eventually came to till the soil pay a higher price for the land than would have been necessary had it been held by the government until such time as it was wanted for real use.

The policy most open to criticism is that of granting such principalities to railway companies. No doubt the policy encouraged railway building, but no doubt also railways were built too rapidly. They anticipated business by too long a period, were built by men who had had little or no experience in the railway world, and were destined to fail. There is abundant evidence to show that railways could have been built, and would have been built in all but a few cases, as soon as there was much need for them, without the great gifts of land.

One sorry effect of the great liberality of the land policies by which settlement was encouraged, and almost never restrained, was the almost unbelievable rapidity of settlement of the western country. Population and grain production doubled throughout the great grain states in periods of about twenty years, and this at a time in the development when it meant the addition to the farm area of 50 or 60 million acres of farm land and six or eight millions of people per decade. The result was ruinously low prices and a discouraged and restless farm people.

There were no colonization plans such as have been followed in various other countries. The settlement was strictly on the *laissez faire* plan. Settlers took their chances of being able to get community privileges. Whether they had schools, churches, or markets depended on their own sagacity and good fortune.

The people who settled the western country were from our eastern states and in no small measure from Europe, although the newly

arrived immigrant was seldom on the very extreme of the frontier. Without important exceptions the first settlers were poor. Few people who possessed even a few thousand dollars left their old homes to make new ones in the wilderness. Often such people followed along a few years later and bought out for a few hundred dollars the farms of the frontiersmen who in turn moved on and repeated the program of settlement of new land.

The United States can hardly be said to have had or to have a land policy. The great share of the public domain has passed into private hands. It is idle to expend much energy in speculating on what might have been done in a better way. In a rather blind manner Congress throughout a hundred years of time was trying to get the public domain into the hands of settlers. During the first third or more of that period it was hoped that incidentally a goodly revenue would be derived from it. During two-thirds of the period there was a strong feeling that the amount of land was inexhaustible. At times there was fraud and graft, but this was the exception so far as Congress itself was concerned. That fraud was practiced upon the government many times is beyond doubt.

The lack of a policy is the most conspicuous occasion for criticism of the acts of Congress relating to the federal domain. Politics often played the major rôle. At present what is needed is a plan by which the government may administer the affairs of land yet in its hands in such a manner as to result in putting it into the hands of people who will use it for production instead of exploitation. Likewise the state governments need land policies both with respect to land which they still possess and land which in private hands is being used with a view to speculative gains to the present owner, resulting in hardship to the man who actually undertakes to turn a portion of it into a farm.

216. OUR LAND POLICY AS IT IS AND AS IT SHOULD BE[1]

By HENRY GEORGE

The best commentary upon our national land policy is the fact, stated by Senator Stewart, that of the 447,000,000 acres disposed of by the government, not 100,000,000 have passed directly into the hands of cultivators. If we add to this amount the lands which have been granted, but not delivered, we have an aggregate of 650,000,000

[1] Adapted from *Our Land and Land Policy*, pp. 11, 89, 92, 98–102. (Published by Doubleday, Page & Co.)

acres disposed of, but only 100,000,000 acres of it directly to cultivators—that is to say, six-sevenths of the land has been put into the hands of people who did not want to use it themselves, but to make a profit from those who do use it. A generation hence our children will look with astonishment at the recklessness with which the public domain has been squandered. It will seem to them we must have been mad, for certainly our whole land policy, with here and there a gleam of common sense shooting through it, seems to have been dictated by the desire to get rid of our lands as fast as possible.

Is our policy calculated to give to all men an equal chance? We have seen what it is—how we are enabling speculators to rob settlers; how we are by every means enhancing the tax which the many must pay to the few; how we are making away with the heritage of our children, and putting in immense bodies into the hands of a few individuals the soil from which the coming millions of our people *must* draw their support. If we continue this policy a few years, the public domain will all be gone; the homestead law and pre-emption law will remain upon the statute books but to remind the poor man of the good time past, and we shall find ourselves embarrassed by all the difficulties which beset the statesmen of Europe—the social disease of England; the seething discontent of France.

Was there ever national blunder so great—ever national crime so tremendous as ours in dealing with the land? It is not in the heat and flush of conquest that we are thus doing what has been done in every country under the sun where a ruling class has been built up and the masses condemned to hopeless toil; it is not in ignorance of true political principles and in the conscientious belief that the God-appointed order of things is that the many should serve the few. We are monopolizing our land deliberately—*our* land, not the land of a conquered nation, and we are doing it while prating of the equal rights of the citizen and of the brotherhood of men.

Nor can we flatter ourselves that the inequality in condition which we are creating will right itself by easy and peaceful means. It is not merely present inequality which we are creating, but a tendency to further inequality. When we allow one man to take the land which should belong to a hundred, and give to a corporation the soil from which a million must shortly draw their subsistence, we are not only giving in the present wealth to the few by taking it from the many, but we are putting it in the power of a few to levy a constant and an increasing tax upon the many, and we are increasing the tendency

to the concentration of wealth not merely upon the land which is thus monopolized, but all over the United States. Even if the large bodies which we are giving away for nothing or selling to speculators for a nominal price, are subdivided and sold for small farms, the mischief we have done is not at an end. The capital of the settlers has been taken from them, and put in large masses into the hands of the speculators or railroad kings. The many are thereafter the poorer; the few thereafter the richer. Our whole policy is of a piece—everything is tending with irresistible force to make us a nation of landlords and tenants—of great capitalists and their poverty stricken employees.

The life of all the older nations shows the bitterness of the curse of land monopolization; we cannot turn a page of their history without finding the blood stains and the tear marks it has left. But never since commerce and manufacture grew up, and men began to engage largely in other occupations than those connected directly with the soil, has it been so important to prevent land monopolization as now. The tendency of all the improved means and forms of production and exchange—of the greater and greater subdivision of labor, of the enslavement of steam, of the utilization of electricity, of the ten thousand great labor-saving appliances which modern invention has brought forth—is strongly and more strongly to extend the dominion of capital and to make of labor its abject slave.

When we reflect what land is; when we consider the relations between it and labor; when we remember that to own the land upon which a man *must* gain his subsistence is to all intents and purposes to own the man himself, we cannot remain in doubt as to what should be our policy in disposing of our public lands. We have no right to dispose of them except to *actual settlers*—to the men who really want to use them; no right to sell them to speculators, to give them to railroad companies, or to grant them for agricultural colleges; no more right to do so than we have to sell or to grant the labor of the people who must some day live upon them, and to actual settlers we should *give* them. Give, not sell. For we have no right to step between the man who wants to use land and land which is yet unused, and to demand of him a price for our permission to avail himself of his Creator's bounty. *And we should give but in limited quantities.* For while every man has a right to as much land as he can properly use, no man has a right to any more, and when others do or will want it, cannot take any more without infringing on *their* rights. One hundred sixty acres is too much to give to one person; it is more

than he can cultivate; and our great object should be to give everyone an opportunity of employing his own labor, and to give no opportunity to anyone to appropriate the labor of others. We cannot afford to give so much in view of the extent of the public domain and the demand for homes yet to be made upon it. While we are calling upon all the world to come in and take our land, let us save a little for our own children. Nor can we afford to give so much in view of the economic loss consequent upon the dispersion of population. Four families are not enough to secure the greatest return to labor and the least waste in exchanges. Eighty acres is quite enough for anyone and I am inclined to think forty acres still nearer the proper amount.

But still the adoption of such a policy would affect only the land that is left us. It would be preventive, not remedial. I hardly think, agitate as we may, that we can secure the adoption of such a preventive policy until we can do something to make the monopolization of land unprofitable. What we want, therefore, is something which shall destroy the tendency to the aggregation of land, which shall break up present monopolization, and which shall prevent future monopolization. We cannot have any difficulty in discovering such a remedy in the adjustment of taxation.

(Accordingly, Mr. George proposed that the government should collect the whole of the economic rent of all land, as a single tax, abandoning all other forms of taxation.—EDITOR.)

217. TAXATION AS A MEANS OF DISCOURAGING LARGE HOLDINGS[1]

Title: "AN ACT to provide for a graduated tax on land holdings in excess of six hundred and forty acres of average taxable lands, and a graduated tax upon the income, rents and profits of lands held by lease or rental contract in excess of 640 acres."

Graduated land tax:

"All persons owning land in this state of taxable value equivalent to 640 acres of average taxable value, or less, shall pay the same ad valorem tax rate as is levied and charged for all purposes of government against personal or other property in this state; and any person owning land of equivalent taxable value in excess of 640 acres of land

[1] Synder, *Laws of Oklahoma*, 1909, p. 1558; *Laws of 1907–8*, p. 724 (*declared unconstitutional*).

of average taxable value and not to exceed 1,280 acres of land of average taxable value, shall in addition thereto pay upon all such excess aforesaid $\frac{1}{4}$ of one per centum upon such excess; and any person owning land of a taxable value in excess of 1,280 acres of land, of average taxable value, and not exceeding 3,000 acres of land of an average taxable value, shall in addition pay an extra rate of 1 per centum per annum on said excess; and any person owning land in excess of 3,000 acres of average taxable value and not exceeding 5,000 acres of land of such valuation, shall pay an extra tax of 2 per centum per annum upon such excess; and any person owning land of average taxable value in excess of 5,000 acres, and not exceeding 10,000 acres of land of such value, shall pay an extra tax of 5 per centum per annum upon such excess; and any person owning land of a taxable value in excess of 10,000 acres and not exceeding 25,000 acres, shall pay an extra tax upon such excess of 10 per centum per annum upon such excess; such excess in each case to be levied and collected in addition to regular ad valorem tax levied by law and such graduated excess shall be calculated upon the basis fixed for taxation upon such land exclusive of improvements thereon; until otherwise provided for by law, twenty dollars per acre shall be deemed and construed as the average value of Oklahoma lands and any number of acres, or any fraction of acres of the taxable value of $20.00 shall be treated for purpose of this act as one acre of average land, provided, however, that 320 acres of land shall be exempt from this tax, regardless of the value thereof."

Leased lands:

"In addition to other taxes levied, every person holding land under lease or rental contract, or title, less than fee simple, the fee of ownership of such land being in other person or persons, natural or artificial, in excess of 640 acres shall pay on incomes, rents, and profits accruing to the lessee from such land in excess of 640 acres and not exceeding 1,280 acres, an extra tax upon such excess of 1 per centum per annum upon all of the incomes, rents, and profits, to him accruing therefrom—

1,280	acres	and	not	exceeding	2,500	acres	3	per	centum	
2,500	"	"	"	"	5,000	"	5	"	"	
5,000	"	"	"	"	10,000	"	10	"	"	

upon incomes, rents, and profits accruing from such excess."

218. THE SMALL HOLDINGS MOVEMENT IN ENGLAND[1]

By C. R. FAY

England has felt the agricultural competition of the United States for nearly fifty years and of Canada, Argentina, and Australasia during the latter part of that period. Other countries of Western Europe have felt it no less than England, but they were better able to meet it, because from the beginning they had a strong peasant proprietary. This was particularly suited to the growing of the small products of the farm, such as vegetables, fruit, poultry, milk, and pigs, and because it was to these products that the trend of international agriculture was more and more inclining in Western Europe. In England we have, indeed, always had some small farms, but at the time of the agricultural enclosures of a century ago, the small yeoman class, preserved on the Continent by special legislation, was squeezed out of existence, as a compact body, by the harshness of the enclosure acts.

A recent law in England, the Small Holdings and Allotments Acts of 1907, now superseded by the consolidating Act of 1908, is aiming to increase the number of small farmers. The Act of 1908 provided for the acquisition of land by the County Councils (through compulsory purchase, if need be), to be relet by them to suitable tenants in small holdings and allotments of from 1 to 50 acres. The tenants have power to purchase, but they have rarely used the power. It also encourages the formation of co-operative small holdings and allotments associations on the one hand, and of co-operative trading societies and credit banks on the other.

That the act is bearing fruit may be judged from these facts: first, that in April, 1908, applications had been made for land amounting to 167,000 acres; second, that since the passing of the act 130 small holdings and allotments associations have been created, of which 10 were in possession of land in July, 1909.

219. LAND REFORM IN TEXAS[2]

By LEWIS H. HANEY

We argue it as though our only choice lay between abolishing tenancy altogether and a continuous increase in tenancy as at present. But tenancy is partly bad and partly good, and it is not desirable that all farmers should always own the farms they work. There are many

[1] Adapted from *Quarterly Journal of Economics*, XXIV (May, 1910), 500–501.

[2] Adapted from *Bulletin of the University of Texas*, 1915, No. 39, pp. 5–11.

good farmers who do not have the capital, or who do not have the qualities needed for the responsibilities of independent management of a business, and such farmers do well to rent. What we need is to foster such conditions as will facilitate land ownership on the part of those who are really capable and desirous of being owners.

We need to remember that in the North and in England there is a large percentage of tenancy, but no such tenant problem as ours. The trouble, then, is not in tenancy, but in the kind of tenancy. In the writer's opinion, it is thoroughly ill-judged to try to give to every farmer in Texas the independent management of a farm—or to do so to even 90 per cent.

The mention of different degrees of success with tenancy calls to mind another point at which we, the people, are failing to make a necessary distinction. There are tenants and tenants. Also there is tenancy and tenancy. Is it not folly to talk about "the tenant problem" when we are covering things as different as the renting of farms "on the halves" and cash rent? As a matter of fact, the "share-cropper" who furnishes no capital and pays half the crop to the landlord, is not a tenant in the sense that the one who does furnish capital and only pays one-third of the crop is a tenant. The former is, as a rule, virtually a laborer; and often he would be much better off if, instead of being made to go through the motions of real tenancy and run the risks of an independent manager, he were hired as a farm laborer and paid a monthly cash wage. Until we distinguish the problem of the "tenant" working regularly on the halves from the problem of the "tenant" who works on the third and fourth basis or on a cash rental, we are bound to make mistakes.

Finally, I would call attention to the distinction between *acquiring* and *stealing*. It is getting too common on the part of certain radical reformers to imply that, because land values are often not made by landowners, such values are stolen from society. It is one thing, however, to find, acquire, or receive a thing, and quite another to steal, filch, or purloin a thing. We cannot think straight on the land problem if we are going to assume that there is anything morally wrong in owning land. This, that, or the other individual landowner may abuse his power; but the general institution of private property in land is a question of expediency—not morals.

Now undoubtedly there are such things as "grasping landlords"; but there are also such things as inefficient tenants. There is a problem of just rent, though we cannot solve it by any general legislation

as to rates. That any fixed fraction of the gross value of the crop cannot be set up as the just rent in all cases, is apparent; for, aside from all questions of evasion, rent must be reckoned on the basis of net returns, after deducting expenses, while the crop (gross value) does not indicate the amount of expense involved. What we need is some system of arbitration between landlord and tenant—some land court, whose duty shall be to take into consideration the facts of each case, including expenses and net return, and bring the parties to agreement as to a just rental.

One warning needed by the cursory student of the land problem is that he should beware the glamour of the panacea. It is so easy to say, "The whole system is rotten. Let us try a new deal." But progress is rarely made by revolution. We must distinguish between radical action and progressive reform. It is not necessary to overturn all our institutions in order to remedy social ills. A logical program of reform based on an analysis of causes would be in part as follows:

1. Legislation and education to facilitate self-help and to remove barriers to progress.
 a) Co-operative organization.
 b) Conservation.
 c) Better relations between owners and tenants.
 d) Modification of homestead law, etc.
2. Taxation to socialize strictly unearned incomes and give equal opportunity.
 a) Tax on future increments in land values.
 b) Inheritance tax.
 c) Progressive tax on large holdings.
3. Regulation of contracts in which experience shows one class is likely to be overreached by another.
 a) Establishment of fixity of tenure (with reasonable safeguards).
 b) Establishment of land courts to arbitrate rents and tenure.
 c) Provision for compensation for improvements made by tenants.

All these things, and more, have been tried and have attained a measure of success. They are not based upon bitterness and class hatred, and consequently are not so exciting as socialism and the single tax. They proceed from a recognition of the fact that the land problem is but one phase of a complex mass of imperfections and maladjustments which make up the larger social problem—a problem that will always be with us as long as men so multiply as to press upon the existing means of subsistence, however much we may minimize it through the establishment of more perfect justice.

XIII

INTEREST ON FARM LOANS

Introduction

We have already noted (chapter v) the part played by capital-goods in the productive process. The demand for capital with which to equip American agriculture has grown constantly and with tremendous rapidity, owing first to the enormous geographical expansion of our agricultural domain and secondly to recent improvements in the technique of the industry. What supply this demand shall equate itself with depends, as Professor Ely points out, upon the willingness of the people to forego the consumption of all that they produce and save some portion of their income for further production. It was pointed out in the chapter on consumption that rural populations have, in general, shown no lack of foresight or willingness to make the sacrifices necessary to such capital accumulations. But it is equally evident that the capital accumulated by the agricultural population needs to be supplemented by loan funds saved from the wages and profits of city employment. Probably the marginal saver is the factory hand who is just persuaded by skilful solicitation to put a dollar or two from each week's pay into the savings bank or pay it as the weekly premium on an industrial life insurance policy.

But we must not forget that the price of capital use is like all prices in that it has two aspects, one the producer's price and the other the price that the consumer pays. If the factory laborer was induced to make his saving for a reward of 3 per cent and the ultimate user of that dollar pays at the rate of 9 per cent, it is evident that a high middleman's charge has intervened and that actual abstinence is being rewarded only with a "thirty-five cent dollar." Section B of this chapter should be read in connection with the chapter which follows, for it is in this question of the middleman cost of loans that many of the difficulties in our rural credits problem arise.

Likewise we should bear in mind that suppliers and demanders of loans do not meet and compete in one great single money market, but that the circumstances of their bargaining are more or less separated

in both time and place. Selection 226 points out numerous reasons why the market price of loans should vary in quite the same way in which the price of wheat varies at different times and in different markets. Where these barriers are artificial in character, wise legislation will aid in removing them and in giving a high degree of fluidity to capital. But so long as the market situation is one in which a strong demand meets a relatively scarce supply of loan funds, no amount of legislative price-making will make loans cheap.

A. The Theory of Interest

220. THE RATE OF INTEREST[1]

By F. A. WALKER

It has been said that interest is the compensation paid for the use of capital. The usual form of statement is that interest is paid for the use of money. Broadly speaking, this is not true. Money is, indeed, often the agent in effecting the loan of other species of capital. But money is not always, in a highly advanced state of industrial society, it is, indeed, rarely, the agent in effecting the loan of capital. The country merchant buys goods and gives his notes for two, four, and six months, promising to pay the price with interest. Interest on what? On money? No money passed in the transaction. What was borrowed was hardware and crockery, dry goods, and groceries. The young farmer buys cattle to stock his farm and gives his note, promising to pay, with interest: not interest on money, for he has had none, but interest on the value of cows and working oxen.

Let us now inquire how the rate of interest is determined. Since the use of capital is a matter of bargain and sale, or of exchange, what should determine the rate of interest but the demand for, and the supply of, loanable capital?

If the people of a community be thriving and progressive, the demand for capital, to start new enterprises, or to enlarge those already established, will be very great. If the community be also young, having brought to new fields the social and industrial ideas, tastes, and ambitions of an old society, the supply of capital will be scanty, and the rate of interest will rule high.

Is this high rate of interest a hardship? No, the hardship lies in the scarcity of capital. The high rate of interest becomes the active

[1] Adapted from *Political Economy*, pp. 219–32.

means of removing that hardship, through increasing the supply of capital available to meet the demand. Capital is, as we have seen, the result of saving. Interest, then, is the reward of abstinence. The strength of the motive to accumulation will vary with the reward of abstinence. If that be high, the disposition to save will be strengthened, and capital will be rapidly accumulated; if that be low, that disposition will be relatively weak, and capital will increase slowly, if, indeed, the body of existing capital be not dissipated at the demands of appetite.

We do not say that the strength of the disposition will increase proportionally to the increase of remuneration; that it will, for instance, be one-fifth greater at 6 per cent interest than at 5 per cent. Moral philosophy has reached no such precision in gauging motives. But it is certain that, among the same people, and at the same time, the higher the rate of interest the stronger will be the motives which lead to saving: the more rapid the accumulation of capital. So we see that a high rate of interest, instead of being the cause of an evil, is really its cure; and that to depress the rate of interest as, for example, by force of law, would be to retard the processes by which capital is supplied.

As a high rate of interest is not in itself an evil, so a low rate of interest does not necessarily imply a condition which is a subject of congratulation. A low rate of interest may mean that the accumulation of capital has gone on so rapidly as to outrun the occasions for its productive use. It may mean that the people are so dull, indolent, and unambitious, or the state of society so disordered, that commercial and manufacturing enterprises are not undertaken, and no enlargement of traditional industries is looked for. A small amount of capital more than suffices for such scanty needs.

The plain facts of interest seem to controvert the proposition that in one market, at one time, there can be but one price for equal portions of the same commodity. Differing rates of interest in the same market are due (excluding the false interest sometimes paid as insurance of the principal) to imperfect competition in the money market. Now, perfect competition only exists where there is ample and accurate information. In bargains relating to the use of capital, so little is known by the parties respecting the supply of and the demand for capital, especially where usury laws drive borrowers and lenders to shifts and evasions; so much more are men disposed to conceal the

fact and the extent of their borrowing than of their buying; so much does the retainment of the principal depend, in spite of law, upon the good faith of the borrower, that the market for the loan of capital can rarely be called a good market. All bargains in the "money market," as the market for the loan of capital is popularly called, take place necessarily upon information imperfect at the best, often of a private and confidential nature: hence it frequently happens that, in the same market, at the same moment, loans upon equally good security are made at different rates.

Of course, all that has been said of differing rates of interest in the same market holds good of different markets; but, wholly in addition to the causes which produce those differences, is reason found for different rates in distinct markets. Thus it is notorious that, for long terms of years, the loan of capital could be obtained, upon what was locally regarded as approved security, for 4 per cent in London as freely as for 6 per cent in New York, or 8 per cent in Chicago, or 12 per cent in Iowa or Kansas. Whence these differences? In some degree, doubtless, these successive additions of interest, as capital passed westward, were of the nature of insurance on the principal sum lent.

But not all, or even the greater part of the differences which have been noted are due to this cause. It is the disinclination of capital to emigrate, which allows such wide differences in the local rates of interest. This disinclination is due to various causes. In part, it is due to the suspicion that strangers may not be fairly dealt with by courts and by officers of the law, in cases of seizures or foreclosures. In part, it is due to the apprehension of the effect of international hostilities, which cause a suspension of interest-payments, if not forfeiture of the principal. In part, it is due to the fact that investments made at a distance must generally be made through an agent, upon whose good faith or sound judgment may depend the fate of the principal invested. While these and other causes may operate, singly or in conjunction, to create local differences, the main cause of such differences is found in the inertia of the owners of capital, making them ready to accept lower rates upon the spot than could perhaps be obtained with no less safety, through inquiry and effort at a distance, and, secondly, in the necessary lack of information as to prevailing rates of interest and existing degrees of security for the principal.

221. CONDITIONS OF DEMAND FOR LOAN FUNDS[1]

By F. W. TAUSSIG

Production with capital has been aptly described, in Böhm-Bawerk's phrase, as indirect or roundabout production. Labor is first applied to making tools, collecting materials, perfecting means of communication; finally, at the close of preparatory steps which may be long and arduous, the enjoyable produce emerges, and emerges in much greater abundance than if labor had been applied directly. Practically all modern forms of industry are carried on by a prolonged and time-requiring process of production.

Further, production in the most advanced communities of modern times is "capitalistic" in another sense; there is a class, separate in the main, of capitalists. The long-maintained application of labor in successive steps is possible only if at the outset there has been a surplus—if there has been saving and accumulation in some form. The persons who do the saving and possess the surplus are commonly, though not necessarily, a different set from those who do the labor. They hire the laborers in the various stages of the productive operations. The creation of capital, and the emergence of interest as a distinct element in distribution, are alike the consequences of the double process of surpluses saved and of labor applied in roundabout ways.

We have now to note more explicitly that this process means an increase in the productiveness of labor. The great modern flour mill is more efficient than the modest grist mill of former times. Per unit of labor applied, more is accomplished. To make an accurate comparison of labor product between two such cases would call for intricate computation. On the one hand, the modern mill stands for much more of preparatory labor. On the other hand, it is usually more durable, and the labor applied to making it continues to play its part through a long period, until the mill is worn out and discarded. The later labor in the series—that done by the current workers in the modern flour mill, who turn out their thousands of barrels a day—seems much more effective than that of the old-fashioned miller; because we do not ordinarily think of the preliminary labor embodied in the plant as engaged in milling. That, even so, the efficiency of all the labor engaged, of earlier as well as of later date, is greater, is

[1] Adapted from *Principles of Economics*, II, 6–11. (Copyright by The Macmillan Co.)

shown by the simple comparison of prices: flour is vastly cheaper (that is, the excess in price of flour over grain) than in former days. So in the railway: there has been an enormous application of capital—that is, of previous labor—with an outcome of transportation rates so low as to prove that, taking account of all the labor of construction, maintenance, and operation, its efficiency is immensely greater than that of the simpler instruments of pack horse and wagon.

This consequence has sometimes been stated by saying that capital is productive; a phrase which must be used with care. The strictly accurate statement is that labor applied in some ways is more productive than labor applied in other ways. Tools and machinery, buildings and materials are themselves made by labor, and represent an intermediate stage in the application of labor. Capital as such is not an independent factor in production, and there is no separate productiveness of capital. When in the following pages the productivity of capital is spoken of, the language must be taken as elliptic, expressing concisely the result of the capitalistic application of labor.

Supposing capitalistic ways of production to have been so settled and established as to be known to all and that they are equally available for all, then competition will bring the return in all channels of investment to the same level. What will determine that uniform level?

All the constituent parts of capital, though they will yield the same return to those employing them, will not necessarily affect to the same degree the productiveness of labor. Some may be, and almost surely will be, more helpful in production than others. Imagine that a community, once in possession of a stock of tools and appliances, is compelled to part, by successive steps, with instalments of this capital. Clearly it would first relinquish those parts which contributed least to the efficiency of labor, and then, as more and more had to be given up, would relinquish others in the inverse order of serviceableness. It would reserve to the very last those constituents of capital—that is, those means of roundabout production—which added most to the efficiency of labor. These means—the last to be given up, the first to be used under existing conditions—would probably be, on the one hand, the agricultural processes which, in the temperate climate, involve seasonal operations, such as seed and farming tools, and about a year's surplus of food; and, on the other hand, the metallurgical processes which yield iron, the prime requisite for almost all tools.

Under such conditions the gain, or premium, or interest, which the owners of capital will secure, will be determined by the least productive use of capital; or, to be accurate in language, by the addition to the ultimate product of labor which results from the least effective phase of the roundabout or capital-using process. Those who use capital in ways more effective than the least cannot retain the superior gain for themselves. Since all who have capital at command can turn to these more effective ways, competition will prevent any one set of persons from securing especially high gains from them. It is the productivity of the last or marginal instalment of surplus or capital (last in the order of productivity) that determines the rate of gain for all capital.

Böhm-Bawerk and some recent American economists have developed the theory of interest in a somewhat different manner, calling attention to the indefinite increase of the output per unit of labor by resort to more and more capitalistic and roundabout processes, an increase, however, which does not take place continuously at the same pace. This decline in the *rate* of increase of production, or diminishing return to capital, may be likened to the obstacle encountered in pulling a stout rubber band: it can always be stretched a bit more, but each additional application of force means a lessened effect.

In this view, it will be seen, differences in productivity and marginal productivity appear not only on taking a cross-section of industry at a given moment, but in the development of industry over the course of time. The tendency to diminishing gain in efficiency may indeed be counteracted by inventions and improvements. But in the absence of such progress, the marginal increase of gain tends to sink and so, too, the rate of return on capital; and it sinks gradually and with some degree of regularity. Since the Industrial Revolution, the progress in the arts has been such as to support the proposition that the increase of savings and of capital has brought and will bring greater efficiency of labor without visible limits. How long it will continue cannot be predicted.

However that may be, there seems to be substantial agreement among modern economists concerning the main conclusion stated above—that, at any given period, the rate of return on capital depends on the gain in productiveness from the least effective part of the capital. Whether or no it is believed that there is a separate produc-

tivity of the capital as distinct from the labor, and whether or no it is believed that the differences in the productivity of capital show themselves through a process of diminishing returns, it seems to be agreed that the factor which determines the rate of interest on capital used for production (so far as it is dependent on demand) is the gain in efficiency or output accruing to the last or marginal instalment of capital.

222. FACTORS DETERMINING THE SUPPLY OF CAPITAL[1]

By RICHARD T. ELY

Why is the supply of capital limited? This question leads us to examine the nature of the supply of capital. Imagine a society without capital carrying on its productive processes by the use of labor and land only. So long as the members of this community produce only what they consume directly or so long as they spend all their money incomes (if a money economy may be imagined to prevail despite the absence of capital) for things used up immediately in the satisfaction of their wants, there will be no accumulation of capital. In order that capital shall be furnished, it is necessary that some members of the community turn aside from the production of things that are used in the immediate satisfaction of their wants and devote their time to the production of goods that will be used in further production. Whether they do this on their own account, or whether they are paid for it by others, some postponement of the satisfaction of wants is necessary. In the one case those who produce the capital goods give up temporarily the satisfactions which they might have derived from the consumption goods which they could have produced. In the other case, those who are devoting part of their money incomes to the payment of those who are producing capital goods are giving up the immediate satisfactions which they might have secured with the money. In either case the production of capital involves the sacrifice of *waiting* on the part of some members of the community. But why should waiting be called a sacrifice? Do not those who give up present satisfactions in order that capital goods may be produced get a full repayment if they get back in the form of the products of their capital goods as much as they, for the time being, give up? In

[1] Adapted from *Outlines of Economics*, pp. 420–22. (Copyright by The Macmillan Co.)

other words, why should capital not be furnished for productive purposes if those who furnish the capital get back the exact equivalent (in value) for the amount of capital they have supplied? Why should an extra payment, in the form of interest, be necessary to induce saving?

The answer to these questions is found in the difference between present and future values. Our present wants are more intense than our present estimates of our future wants of a similar kind. We visualize the present more vividly than we do the future; we yield sometimes to the temptation of satisfying the more trivial wants of the present, even when we know that we are thereby rendering uncertain the satisfaction of more important wants in the future; and when we take considerable periods of time into account, we may reasonably say that the uncertainty of life itself gives us some ground for preferring present to possible future satisfactions. Notwithstanding the vast difference between civilized men and savages in this respect—for many of the latter seem to have absolutely no regard for future needs—the fact still remains that waiting is a sacrifice, and in order to induce the saving that is a prerequisite to the use of capital in industry, a premium or reward for waiting has to be paid in the form of interest. This fact is the most fundamental thing in the explanation of interest.

To be sure, some savings would doubtless be made even if interest were not paid, owing to men's natural desire to provide for old age, for their families in case of the death of the breadwinner, or for the mere pride of accumulation. None of these motives would in themselves induce men to invest or lend their saved funds in productive undertakings if no interest at all were paid. In fact, this would be a matter of indifference, for savings might just as well be hoarded. But a very low interest premium would suffice to overcome this indifference and to bring about their investment in productive undertakings. Even this low interest rate, however, would be sufficient to balance, in some additional cases, the difference between the intensity of present wants and the intensity of future wants, so that in these cases, in turn, spending and saving would be a matter of indifference—an indifference that would be in its turn overcome by a slight increase in the interest rate. In a similar way every increase in the interest rate would induce more persons to save and would induce many of those who were already saving a part of their incomes to save a larger proportion of them. At any given time, accordingly, the

rate of interest is considerably higher than would be necessary to compensate for a large part of the waiting that devolves upon those who furnish capital funds for productive purposes. It is just high enough, however, to be a recompense for *marginal waiting*, which is the waiting that would not take place if the interest rate were any lower. If the interest rate is 5 per cent, a dollar today is worth a dollar and five cents a year from today, not to all savers, but to the marginal savers.

B. Other Factors in the Cost of Loans

223. GROSS INTEREST AND NET INTEREST

Economists have been in the habit of drawing distinctions between true and false interest, gross and net interest rates. Thus Walker (*Political Economy*, p. 225) says:

A great deal that is paid under the name of interest is not interest in the true sense, but is merely a premium for the insurance of the principal sum lent. Real interest comprises only that part of the payment made which would be paid were the return of the principal, at the date of the maturity of the obligation, a matter of reasonable certainty. Where the risk is so small that it amounts to nothing in the mind of the lender, as in the case of British consols or of a "bottom mortgage," where the sum lent is only a half or a third of the value of improved real estate, we have an instance of real interest, pure and simple. While this real rate of interest may be as low as 3 per cent, loans on various kinds of fair security may range from that rate up to 5 or 6 per cent; and note-brokers are all the time "shaving" the paper of second and third rate dealers at from 10 to 20 per cent discount.

Professor Ely likewise mentions this element of recompense for risk, but notes also that what is called an interest payment often ncludes some element of return to the labor of supervision. He says- (*Outlines of Economics*, p. 437):

While pure interest is the amount necessary to recompense marginal waiting, actual interest often includes some payment for the supervision which the capitalist has to maintain over his investment. Even the man who "lives on his income" usually has to devote a certain amount of time to the investigation of the safety of different possible investments, to the collection of interest and principal, and similar things. The net earnings of a savings bank—the difference between the interest they get on their investments and the interest they pay their depositors—are partly a pay ment for this element of supervision.

224. HOW TO LOWER THE COST OF BORROWING[1]

By CHARLES G. TAYLOR

As an example of the cost of getting money to the farmer, it is known that for five year loans bearing 8 per cent interest, farmers often pay a flat commission of 10 per cent, that is, the farmer gets only 90 per cent of what he borrows, and pays 8 per cent on the face of his note. If this expense is amortized for the five year period, the effective rate of interest is 10.6 per cent. While all farm loans are not made on this basis, the expenses and interest rates are higher than on other investments. On very small loans the rate is often much higher, yet there are frequently conditions present which justify the rate and it is not with such cases that life insurance companies can be expected to deal. The toll exacted from the borrower for services performed prior to his receipt of the money depends frequently upon his necessities as they are known to the loan broker. These loans are made for short periods, sometimes for one year, frequently for five years, rarely for longer periods, and generally do not give the privilege of curtail before maturity. The first cost would not be so burdensome if spread over a longer period. When the date of maturity of the farmer's note arrives, frequently he has spent in other improvements the surplus income that could have been applied to reduce his loan, had he been required or permitted to do so, and he is far too frequently forced to renew, and face a repetition of the heavy expense which he paid to secure the first accommodation. Had the loan been curtailed from time to time, a renewal without expense should not be difficult in view of the increased security. Probably some education of the farmer on the desirability of the annual curtail would be necessary in some sections, but that the plan will, when understood, be received favorably is illustrated by a recent prospective borrower who expressed surprise and delight when required by a life insurance company to make an annual curtail, stating that his debt would have been paid years before had he been given that privilege. In the minds of many gentlemen present such interest rates and commission charges will no doubt be taken to indicate very poor security and very poor credit, but these facts are true as to men who deserve credit rating of the highest character, and have security to offer, the value of which can-

[1] Adapted from an address at the Ninth Annual Meeting of the Association of Life Insurance Presidents, New York, December 9 and 10, 1915 (*Proceedings*, pp. 45–58).

not be questioned. When the money must be had for development, and there are no other means of securing it except through local agencies, which usually control the field and demand the pound of flesh, what is the farmer to do? Not to accept the condition imposed means not to go ahead, that is, not to increase his farm facilities, or acreage, while to accept means to do this at a smaller profit than would otherwise be made. Where the farmer is wise and objects to the commission charge, the result often is that the lender, if a non-resident, is advised that the rate must be lowered, while the agent still continues to collect the customary large commission. It is not the purpose of these remarks, however, to bring the loan agent into disrepute. His position is natural so long as he can corner the market, or when there is difficulty in securing foreign capital.

The security behind a well selected farm mortgage is just as valuable and dependable as the values upon the faith of which railroad, industrial, or other like securities are issued. Why then should the farmers' interest rate be, in good localities, 50 per cent, 75 per cent, or 100 per cent more than the rate paid by the railroad, the merchant, the manufacturer, or the farmer in another state? The primary reason is the absence of a highly organized market for the sale of farm secured obligations, or an organization so developed as to bring the farmer and lender together without unnecessary and wasteful effort. The financial genius of our country has been devoted to educating the public to the value of railroad, government and industrial bonds, and other forms of corporate securities, and to making them "liquid assets" by developing a market in which they may be bought and sold at will. Legislative acts have been passed to render attractive the obligations of governments. There is competition among the purchasers of these securities, hence a favorable rate of interest. No concerted, widespread effort under such able financial leadership has been devoted to the rural credit problem. The supply of credit available to the farmer is largely confined to home sources, and a limited number of outside investors. His situation is the reverse of other sellers of credit. The competition is among the borrowers for money rather than among the lenders for investments, therefore the borrowers pay the high rate.

We buy railroad, government, or industrial bonds, without personal knowledge concerning the value of the property securing them, because we have faith in the stock market quotations as expressing their values, or in the opinion of experts, or the statements of officials

as to the values pledged as security for the bonds. In either event, we must have confidence in the integrity of some person or organization and must maintain an organization for getting together the facts relating to the investments and following their course after purchase.

The desirability of a farm loan depends briefly upon the value of the land, and the title to it, the character of the man owning and working it, and the methods he employs. There are no insuperable difficulties involved in judging these factors. There are capable men all over the country who have been making farm loans successfully for years. There are many others equally capable of judging farm values, farming methods, and the character and credit of the farmer. We need an organization large and strong enough to command complete respect and confidence for the handling of farm loans from the initiation of the application to the completion of the last details of the loan, an organization in which the investor could have absolute faith and yet one which would be in direct touch with the borrowers, eliminate unnecessary intermediary costs, and consider his interests fairly. Without some such organization the present difficulties cannot be fully removed.

Why should not the same genius, responsible for the creation of the marvelous organizations gathering in life premiums of from five cents a week to thousands of dollars a year, be able to perfect an organization which will permit the investment of a portion of the resulting funds so as to solve a great national problem and benefit a large portion of our population?

In consideration of these premiums the companies annually assume liabilities of billions of dollars upon human lives selected through an organization which has proven itself reliable. Why not an organization of approved appraisers and title examiners modeled after the present medical and agency organizations?

"Big operations and low operating costs" is a modern business watchword. If the amount of investment necessary to accomplish the purpose in question should be too great for any one company, why should not this Association, or one like it, undertake to work out some co-operative plan by which life insurance funds may be loaned to farmers on terms of payment suited to their needs, at a fair rate of interest and at a minimum of expense? The development of a nation-wide organization for handling farm loans would immediately stimulate public confidence in such investments and create a ready market therefor. Again, by giving the farmer a reasonably long term for

the payment of his loan, and requiring an annual curtail maturing at periods best suited to local conditions, the account would be made sufficiently liquid, even in stringent times, to satisfy the demands of a life insurance company. When financed in this manner, it would be an easy matter for the farmer, if pressed for funds when payments mature, to secure locally temporary accommodation to enable him to meet maturing payments.

What the farmer can do.—We have said much about what the companies can do to get closer to the farmers. But men do not seek to get closer to those who are not attractive, and money, being directed by men, does not seek unattractive fields. The farmer must do his part. Individually, he can help by not attempting to borrow too great a percentage of his property value, thus making his security more attractive; by being careful to see that his remittances to cover maturities reach the place of payment on time or a day or two in advance rather than whenever it suits his convenience; by maintaining in good state of repair the improvements on his land; by improving his methods of cultivation so as to build up rather than to wear out his land; by supporting legislative measures giving to foreign capital every safeguard and protection which may be reasonably expected.

The farmers' organizations may do more by advertising to the world the substantial value of the lands which its farmers own rather than the speculative and untried opportunities thereof; by organizing for collective rather than individual bargaining for credit and thereby eliminating much of the present expense; by preaching constantly to their members the importance of a fair and reasonable attitude toward foreign capital; by urging upon their members the importance of promptly meeting their obligations in accordance with the terms of the bond or mortgage; by seeking to learn the desires and requirements of foreign lenders so that local conditions may be conformed thereto, if possible; and by advocating the passage of laws framed with the co-operation of those to be attracted thereby, and calculated to render in all respects less difficult the lending of money to their members.

The preparation of an abstract of title is responsible for a large portion of the expense which we have been discussing. After preparation locally, the abstract must be carefully checked by the legal department of the company making the loan, and after all this, unless some method of state land registration has been adopted, it is merely

a matter of opinion as to whether the title is good or not. The question of land registration is therefore one which presents itself for serious consideration by the farmer.

225. THE TORRENS SYSTEM OF LAND TRANSFER[1]

By JEREMIAH W. JENKS

No person has had occasion to sell a piece of land, large or small, or to borrow money on a mortgage, in any of our states, even including the newer ones, without being impressed with the difficulty and expense attending our system. Why should not real estate be as readily transferred as government bonds or railroad stock?

The Torrens system of land transfer by registration of title is a system that really accomplishes, in a great measure at least, just this desired result. Notice that, in a word, the system differs from our own in this: We register a deed, and the deed conveys the title. In the Torrens system, the title is transferred by registration; the certificate given, a duplicate of the one preserved in the Registrar's office, is merely in law a certificate that a transfer has been made, and a minute of the nature of the transfer.

In the countries where this system has been adopted, there is no compulsion regarding the registration of land owned by private parties. If any landowner wishes to place his property under this system, he makes formal application at the Land Transfer office, declaring the nature of his title to the land in question, and depositing his deeds, abstracts of title, or other evidences of title. The evidences of title, together with officially certified survey or plan of the land, is then submitted to a barrister and conveyancer, "examiners of title," who report to the Registrar or Recorder of Titles on the following points: whether the description of the parcel of land is definite and clear; whether the applicant is in undisputed possession; whether he appears in justice and equity entitled thereto; whether his evidence of title is sufficient to protect him in a suit against him for ejectment. If the applicant fails to satisfy the examiner on any one of these points, his application is at once rejected. If, however, the applicant, being in possession, is able to satisfy them reasonably on all these points, even though some technical flaw may appear in the title, advertisement of the application is made, and notices are given to any who may have an interest, that unless a caveat is filed within a certain

[1] Adapted from *The Annals*, II, 49–55.

time, the land will be registered in accordance with the application. If the caveat is filed, action is delayed until it is either withdrawn or set aside by action of the court, "when the land is brought under the operation of this system by the issue of a certificate of title, vesting the estate indefeasibly in the applicant."

This certificate, a duplicate of which is retained in the office, sets forth in detail, though briefly, a description of the land, usually with a plan or reference to a map, and the exact nature of the holder's title, together with a memorandum of all mortgages, leases, or other encumbrance of whatever nature. The one paper is sufficient to show the exact title, and the government guaranty that this title is correct renders all search for "claim" of title, as under our system, entirely superfluous.

This practice of granting an absolute, indefeasible title, guaranteed by the government, after due advertisement and service of notice, is still one that involves very little risk, though that risk is one of the chief objections urged by its opponents. Ireland has brought about one-sixth of her land, and the English colonies over 152,000 parcels under this system, with almost complete immunity from error. Still there is always danger of error and fraud in such registration and subsequent transfer, so that the governments deem it advisable to provide a fund to reimburse those injured by the act of the government in granting an indefeasible title. From one-tenth to one-fifth of 1 per cent of the value of the land, levied when the land is first brought under the system and at subsequent transfers by descent or devise, is found to produce a sufficient guaranty fund.

If a person wishes to sell his land, he makes out a memorandum of transfer in a simple prescribed form; and this with his certificate is taken to the Registrar. The transfer is then entered upon the Registrar's book and upon the certificate, and the new owner has the indefeasible title, with the government guaranty. So, whenever a title is transferred, one folium of the Registrar is enough to show to whom the land belongs, and there is no expense for looking up the title, no worry or doubt regarding a cloud upon it. That is impossible.

If only a part of the land named in the certificate is to be transferred, the memorandum for transfer is given only for that part. The Registrar marks the original certificate and record "canceled" as to that part, and a new certificate is issued to its purchaser, while the register gives it a new folium. Thus, every person holding an estate in land needs only one document to show the exact nature and extent

of his ownership, and the one folium of the register shows the same facts, and always—this is worth repeating—his title is absolutely indefeasible, as shown by the record.

A mortgage or lease or other encumbrance is managed in an equally simple way. The mortgage or lease is executed in duplicate—one is given to the mortgagee or lessee, the other remains in the office. A memorandum of the encumbrance is then made upon the certificate, and upon the Registrar's book, and the work is complete. When the mortgage is paid or other encumbrance removed, a receipt is indorsed on the duplicate held by the mortgagee, and a minute of it made on the Registrar's book and on the certificate of title. Thus, in any case, the folium of the register shows the exact condition of the title. A purchaser, too, may rely upon the record, for the government guarantees the title to be as shown on the register.

In all transactions, present conditions, rights, and claims are shown on the one folium, and no one has any interest in going beyond that. The title, as shown, is indefeasible; the history of the title—all-important under our system—is of no consequence whatever under the Torrens system. The total expense under this system is, as will have been thought from the simplicity of the plan, much less than the sums paid under the old system for abstracts and examination of title—in old states not one-tenth as much—to say nothing of the certainty of the title and the saving of trouble. After the first entry, the cost of which would depend upon the old system, from $5 to $10 would suffice for the average transfer.

NOTE.—Many of the states have taken up this question of the registration of land titles within the last few years and ten states now have laws providing for such registration. Much of the legislation has been defective or inadequate, however.—EDITOR.

C. Some Causes of Variation in Interest Rates

226. INTEREST RATES PAID BY AMERICAN FARMERS[1]

BY C. W. THOMPSON

I shall first present the average short-time interest rates, and the average total annual charge on short-time loans, by states.

[1]Adapted from *Hearings before the Subcommittee of the Joint Committee on Rural Credits*, 64th Cong., 1st sess., Part 3, pp. 86–108.

EXHIBIT A

LOANS TO FARMERS ON PERSONAL SECURITY—AVERAGE RATES FOR INTEREST AND FOR TOTAL COST

Geographic Division and State	Average Interest Rate	Average Total Cost*	Geographic Division and State	Average Interest Rate	Average Total Cost*
New England:			South Atlantic—*Cont.*:		
Maine	6.5	7.7	West Virginia	6.2	6.9
New Hampshire	6.0	6.4	North Carolina	6.6	10.2
Vermont	5.9	6.4	South Carolina	8.3	10.5
Massachusetts	6.0	6.5	Georgia	9.6	11.8
Rhode Island	6.1	7.1	Florida	9.2	11.4
Connecticut	5.9	6.2	East South Central:		
Middle Atlantic:			Kentucky	7.3	8.8
New York	5.9	7.0	Tennessee	8.1	9.9
New Jersey	5.8	6.6	Alabama	10.0	12.4
Pennsylvania	5.9	6.9	Mississippi	8.7	10.8
East North Central:			West South Central:		
Ohio	6.4	7.2	Arkansas	9.9	12.4
Indiana	6.9	7.6	Louisiana	9.0	11 1
Illinois	6.6	7.4	Oklahoma	12.5	15.6
Michigan	7.1	9.2	Texas	10.2	12.2
Wisconsin	6.5	7.0	Mountain:		
West North Central:			Montana	11.1	12.1
Minnesota	8.3	9.2	Idaho	10.4	11.5
Iowa	7.5	7.9	Wyoming	10.2	11.0
Missouri	7.7	8.8	Colorado	10.6	11.5
North Dakota	11.0	11.8	New Mexico	11.4	13.8
South Dakota	9.8	10.6	Arizona	10.0	11.1
Nebraska	8.8	9.3	Utah	8.8	10.4
Kansas	7.5	8.8	Pacific:		
South Atlantic:			Washington	9.8	11.4
Delaware	6.0	6.2	Oregon	8.4	9.6
Maryland	6.0	7.0	California	8.4	9.4
Virginia	6.3	8.2			

* Average of estimated total cost, including "discounts, bonuses, commissions, and any other extra charges," as reported by correspondents.

The trouble with averages, of course, always is that they merge extremes. But I have here a table (Exhibit B) which shows the variations in the interest rates reported from each state and the percentage of the total number of reports for each rate.

These tables refer to all loans made to farmers, by individuals as well as banks. The total costs on loans are shown to be lowest in Connecticut and highest in the southern and Rocky Mountain section. The extreme state average is Oklahoma, 15.6 per cent.

(Exhibit C showed the variations in interest rate and total costs of loans within the state, separate figures being presented for each of the nine crop-reporting districts of the state.—EDITOR.)

CHAIRMAN MOSS: In that connection, Mr. Thompson, were there any factors pointed out or called to your attention as to what caused the variation in the different districts?

MR. THOMPSON: Yes. Let us take a state like Iowa and note just how the figures run there, where the state average is 7.9 per cent. The top row is 7.9, 8.2, and 7.8. Then, the second row is 8.2, 7.4,

and 7.4; and in the south, 8.7, 8.2, and 7.2. In other words, the rate increases as you get away from the financial centers.

EXHIBIT B

SHORT-TIME LOANS TO FARMERS ON PERSONAL SECURITY—PER CENT DISTRIBUTION OF REPLIES RECEIVED ACCORDING TO INTEREST RATE REPORTED

GEOGRAPHIC DIVISION AND STATE	PER CENT OF TOTAL NUMBER OF REPLIES SHOWING AN INTEREST RATE OF———								
	5 Per Cent	6 Per Cent	7 Per Cent	8 Per Cent	9 Per Cent	10 Per Cent	11 Per Cent	12 Per Cent	13 Per Cent or Over
New England:									
Maine		78.3	8.7	8.7		2.2		2.2	
New Hampshire	7.1	85.7	7.1						
Vermont	10.5	89.5							
Massachusetts	4.8	90.4	4.8						
Rhode Island		83.3	16.7						
Connecticut	11.8	88.2							
Middle Atlantic:									
New York	5.1	93.8	1.0						
New Jersey	16.7	83.3							
Pennsylvania	12.8	84.6	1.9	.6					
East North Central:									
Ohio	3.3	61.5	20.3	14.8					
Indiana	4.6	37.6	31.2	26.1		.5			
Illinois	.6	39.0	57.1	1.6	0.3	1.3			
Michigan	.5	24.1	64.5	3.2		2.3	0.5	4.1	0.9
Wisconsin	9.2	44.9	28.1	15.7	.5	1.6			
West North Central:									
Minnesota	.5	8.7	13.5	41.8	6.2	28.4		1.0	
Iowa	.4	8.2	28.0	63.4					
Missouri	.3	11.0	20.8	63.4	.3	2.7		1.5	
North Dakota			1.8	5.7	1.7	29.5	4.0	57.3	
South Dakota			1.6	29.6	3.2	43.6	2.7	18.3	1.0
Nebraska	.4	1.8	8.2	40.7	5.0	42.9	.4	.4	.4
Kansas	.4	1.4	6.0	66.5	4.9	19.7	.4	.7	
South Atlantic:									
Delaware		100.0							
Maryland	2.9	94.3		2.9					
Virginia	.8	82.6	4.1	9.9	.8	1.7			
West Virginia		90.2	2.0	5.9				2.0	
North Carolina		75.7	4.7	14.8	.7	2.0	1.4		.7
South Carolina			3.0	82.8	4.0	7.1		3.0	
Georgia		.7	5.1	51.1	2.9	18.2	1.5	11.7	8.8
Florida				38.6	9.1	47.7	2.3	2.3	
East South Central:									
Kentucky		45.0	7.1	34.3	1.2	11.8		.6	
Tennessee		27.9	4.1	36.0	2.3	26.7	.6		2.3
Alabama		2.1	1.4	36.5		33.8	.7	17.2	8.3
Mississippi		4.0	4.0	61.1	2.0	26.2			2.7
West South Central:									
Arkansas				7.2	.5	90.2	1.0		1.0
Louisiana		1.3	1.3	56.0	4.0	29.4		5.4	2.7
Oklahoma		.04		4.4	.4	44.9	2.2	19.4	28.2
Texas			2.3	12.1	2.0	69.9	.8	6.6	6.3
Mountain:									
Montana				2.7		37.3	1.3	58.7	
Idaho			1.3	3.8	1.3	64.6	8.9	20.3	
Wyoming			2.1	12.8	2.1	55.3	10.6	12.8	4.2
Colorado			1.9	12.3	2.8	42.4	5.7	29.2	5.5
New Mexico				4.3		31.9	8.5	48.9	6.4
Arizona				30.8		30.8	15.4	23.1	
Utah			6.3	50.0	12.5	25.0		6.3	
Pacific:									
Washington			2.5	29.6		42.0	3.7	21.0	1.2
Oregon		4.0	8.0	57.3	1.3	29.3			
California		5.0	17.7	42.6	9.9	17.7		7.1	

REPRESENTATIVE HAWLEY: That is, the west side of the state has a higher rate than the east side?

MR. THOMPSON: Yes, except that the northwestern district has a lower rate because of its proximity to Sioux City.

Let us next consider the case of Wisconsin. Wisconsin has an average total rate of 7 per cent. The three districts across the top [indicating], away up in the northern part of the state, are relatively undeveloped, and have the following averages: 8.4, 7.8, and 8.1. Coming down to the second tier, you have 7.2, 6.7, and 6.3. Now, notice the lowest row, the bottom or southern row, in Wisconsin: There you have 6.8, 6.3, and 6.1, and you notice the 6.1, the lowest average, is for the district nearest to Chicago.

SENATOR SMITH: It is also the section that has more diversified agriculture, selling the entire year through.

MR. THOMPSON: Yes; and it is also a section that has relatively a very large amount of local capital available for loans, and that is a very important factor.

REPRESENTATIVE PHELAN: What is the average rate for Wisconsin?

MR. THOMPSON: The average total rate for Wisconsin is 7 per cent. There are other states that correspond to the one I have just cited there. Take, for instance, the state of Minnesota. The average total cost for the state is 9.2 per cent. If you take the tier at the top of the state you have 10.6 and 11.4, the highest rate being in the north central part of the state. If we were to take the figures I cited for mortgage loans, you would find similar conditions, the highest figures being right up there [indicating] in the north central part, away up in the woods. The second tier, districts 4, 5, and 6, shows 8.7, 9, and 9.4.

Notice the southern districts [indicating]. Their averages from west to east are 9, 8.4, and 6.9. The interesting part there is that the averages for personal loans vary about 1 per cent between each district, while the figures for mortgage loans are practically the same in these districts. This is explained by the fact that the mortgage rates are dependent upon other considerations than those that establish the short-time rates for a given district. In other words, the capital that goes into the one presents problems different from that which goes into the other.

SENATOR SMITH: The stable value of the land is the same?

MR. THOMPSON: Yes.

SENATOR SMITH: But the character of the call for money is so different that the loan rate on the money must be higher?

MR. THOMPSON: Yes; and the sources of supply for the two kinds of capital are different.

SENATOR SMITH: I have in mind that a steady, all-the-year demand brings a source of supply at a much lower rate than a temporary demand during only a portion of the year. It is the steady demand for the money that gets the money utilized and makes the use of the money pay. Sporadic demand necessarily does not meet with supply as steady demand meets with it, and therefore sporadic demand, unless we can do something to help overcome it, must necessarily place heavier burdens upon the borrower or more difficulties will surround him in obtaining it.

CHAIRMAN MOSS: The thought that occurs to my mind is this, that merchants and manufacturers are almost constant customers of a bank, and a farmer is only an occasional customer.

MR. THOMPSON: The reaction from differences in natural conditions is shown in comparing the figures by districts in Nebraska and Kansas. In Nebraska the average for personal loans is 9.3 per cent. For districts 3, 6, and 9, the eastern row, the rates are 8.8, 8.3, and 8.3.

SENATOR HOLLIS: Those are on the edge of the state where the soil is rich and business is heavy.

MR. THOMPSON: And rainfall relatively abundant and climatic conditions favorable. The western row of districts show rates of 10.2, 10.6, and 10.4, respectively.

SENATOR HOLLIS: That is in a very dry part of the state?

MR. THOMPSON: Yes. The same peculiar changes apply if you take Kansas or South Dakota or North Dakota; you will find exactly the same variation. Also in the case of mortgage rates, you will find that they vary in exactly the same way. Here is a table (Exhibit D) showing the average mortgage interest rates and average commissions, and also the totals, by states.

You will notice that the commissions are especially high in North Dakota, Oklahoma, Montana, and Georgia. You will notice that commissions are relatively insignificant in the New England States. The question of whether commissions are charges or not depends upon the source of the capital. In those states where a relatively large fraction of the farm mortgage capital is secured from a distance, from the outside, and where, therefore, it is necessary to utilize middlemen in order to get the capital to the farmer, there commission charges

obtain; on the other hand, to the extent that the capital is supplied locally direct to the farmer from the source of capital, to that extent the charge will be one straight interest charge, ordinarily. The states I have cited, namely, North Dakota, Oklahoma, Georgia, and Montana, do receive relatively very large parts of the capital they have from the outside, from a distance.

EXHIBIT D

FARM MORTGAGE LOANS—AVERAGE RATES FOR INTEREST AND COMMISSION

Geographic Division and State	Average Interest Rate	Average Annual Commission*	Interest Plus Commission	Geographic Division and State	Average Interest Rate	Average Annual Commission*	Interest Plus Commission
New England:				South Atlantic—*Continued:*			
Maine	6.1	0.1	6.2	West Virginia	6.2	0.2	6.4
New Hampshire	5.3	†	5.3	North Carolina	6.3	1.4	7.7
Vermont	5.6	†	5.6	South Carolina	7.8	.6	8.4
Massachusetts	5.6	†	5.6	Georgia	7.6	1.1	8.7
Rhode Island	5.7	.2	5.9	Florida	9.0	.6	9.6
Connecticut	5.7	†	5.7	East South Central:			
Middle Atlantic:				Kentucky	6.7	.4	7.1
New York	5.5	.1	5.6	Tennessee	7.3	.6	7.9
New Jersey	5.5	.3	5.8	Alabama	8.7	.7	9.4
Pennsylvania	5.5	.3	5.8	Mississippi	8.0	.5	8.5
East North Central:				West South Central:			
Ohio	5.9	.2	6.1	Arkansas	9.0	.6	9.6
Indiana	5.8	.4	6.2	Louisiana	8.2	.4	8.6
Illinois	5.7	.3	6.0	Oklahoma	6.6	1.8	8.4
Michigan	6.3	.3	6.6	Texas	8.4	.6	9.0
Wisconsin	5.7	.1	5.8	Mountain:			
West North Central:				Montana	8.4	1.6	10.0
Minnesota	6.3	.5	6.8	Idaho	8.2	.7	8.9
Iowa	5.6	.3	5.9	Wyoming	9.2	.8	10.0
Missouri	6.2	.6	6.8	Colorado	8.3	.6	8.9
North Dakota	6.9	1.8	8.7	New Mexico	9.7	.8	10.5
South Dakota	7.0	1.0	8.0	Arizona	9.1	.3	9.4
Nebraska	6.3	.8	7.1	Utah	8.6	.4	9.0
Kansas	6.1	.8	6.9	Pacific:			
South Atlantic:				Washington	7.9	.8	8.7
Delaware	5.6	†	5.6	Oregon	7.7	.3	8.0
Maryland	5.7	.4	6.1	California	7.4	.2	7.6
Virginia	6.1	.7	6.8				

*Where the report shows a commission paid once for all in advance on a loan running more than one year, the equivalent annual commission is used.

†Less than one-tenth of 1 per cent.

The next table (Exhibit E) shows the relative importance of instalment-commission, advance-commission, and no-commission loans, by states; that is, it indicates the percentages of the total mortgage business in each state on which annual or instalment commissions and advance commissions are charged and the percentage on which no commissions are charged.

In certain states, in the New England States, and in the more highly developed agricultural states of the corn belt, the averages for commissions are relatively low; also the total costs run highest in

the Southern and Rocky Mountain States, but you will also notice that there are variations even between the states in these districts.

EXHIBIT E

PERCENTAGE OF FARM MORTGAGE BUSINESS ON WHICH COMMISSION IS PAID

GEOGRAPHIC DIVISION AND STATE	PERCENTAGE WITHOUT COMMISSION	PERCENTAGE WITH COMMISSION		
		Total	With Commission Paid in Advance	With Commission Paid in Instalments
New England:				
Maine	91.1	8.9	5.0	3.9
New Hampshire	96.6	3.4	3.4	
Vermont	94.1	5.9	4.8	1.1
Massachusetts	97.2	2.8	2.7	.1
Rhode Island	78.3	21.7	11.7	10.0
Connecticut	98.7	1.3	1.3	
Middle Atlantic:				
New York	86.6	13.4	9.6	3.8
New Jersey	72.3	27.7	18.7	9.0
Pennsylvania	81.4	18.6	10.1	8.5
East North Central:				
Ohio	73.7	26.3	17.9	8.4
Indiana	54.5	45.5	36.2	9.3
Illinois	52.7	47.3	39.1	8.2
Michigan	76.8	23.2	18.0	5.2
Wisconsin	85.1	14.9	10.4	4.5
West North Central:				
Minnesota	52.3	47.7	20.0	27.7
Iowa	36.0	64.0	51.3	12.7
Missouri	45.1	54.9	28.0	26.9
North Dakota	20.2	79.8	17.0	62.8
South Dakota	31.8	68.2	45.5	22.7
Nebraska	30.7	69.3	53.5	15.8
Kansas	32.2	67.8	30.6	37.2
South Atlantic:				
Delaware	98.1	1.9	1.9	
Maryland	64.3	35.7	28.5	7.2
Virginia	65.9	34.1	26.2	7.9
West Virginia	88.9	11.1	8.8	2.3
North Carolina	59.1	40.9	27.5	13.4
South Carolina	64.7	35.3	26.0	9.3
Georgia	33.9	66.1	54.1	12.0
Florida	70.2	29.8	18.6	11.2
East South Central:				
Kentucky	76.7	23.3	14.2	9.1
Tennessee	64.6	35.4	23.9	11.5
Alabama	62.8	37.2	25.2	12.0
Mississippi	74.5	25.5	15.7	9.8
West South Central:				
Arkansas	66.9	33.1	18.6	14.5
Louisiana	76.8	23.2	16.3	6.9
Oklahoma	8.4	91.6	36.7	54.9
Texas	57.0	43.0	27.1	15.9
Mountain:				
Montana	31.1	68.9	28.4	40.5
Idaho	35.8	64.2	45.6	18.6
Wyoming	59.9	40.1	28.1	12.0
Colorado	41.7	58.3	47.0	11.3
New Mexico	59.0	41.0	32.8	8.2
Arizona	80.5	19.5	9.5	10.0
Utah	67.0	33.0	18.3	14.7
Pacific:				
Washington	41.8	58.2	46.4	11.8
Oregon	68.4	31.6	23.6	8.0
California	81.0	19.0	15.1	3.9

In a state like Oklahoma a total average cost for mortgage loans is 8.4, of which 6.6 is interest and 1.8 is (*Continued on p. 708*)

227. SEASONAL DEMAND FOR LOANS AND PREVAILING INTEREST RATES[1]

	Seasonal Demand	Used for—	Rate
Arizona	September, October, November, December	Cattle business	8
California:			
Imperial Valley	Spring and early fall	Alfalfa, dairying, cotton, canteloupes	8–10
San Diego	February to June	Lemons, mercantile	7–10
Los Angeles and adjacent counties	Continuous	Dairying, sugar beets, alfalfa, oranges, lemons, walnuts, beans	5½– 8
San Joaquin Valley	Spring and late autumn	Live stock, grain, grapes, peaches, apricots, alfalfa	6–10
San Francisco	Highest peak November; local demand uniform	Taxes, mercantile business	5– 8
Sacramento Valley	Spring and late summer	Hops, alfalfa, grain, grapes, small fruit, live stock	6– 7
Northern California	Early summer and fall	Live stock, grain, dairying, lumbering	6–10
Idaho:			
Southern	February to June	Alfalfa, live stock, wool, grain	6–10
Eastern	July, August, September	Live stock, wool, grain	10
Northern	February to June	Live stock, lumber	10–12
Nevada	Fall of year	Live stock	6– 8
Oregon:			
Coast	Fall	Lumber, fish, packers	6– 8
Southern	August and September	Agriculture, live stock	6– 8
Columbia River Valley	September to January and spring	Live stock, grain, lumber, wool, apples	6– 8
Willamette Valley	August to November	Apples, hops, dairying, grain	6– 8
Eastern	Late summer and fall	Grain, live stock	8–10
Utah:			
Central and northern	Spring and fall	Sugar beets, hay, grain, fruit, live stock	8–10
Balance of state	January to April	Live stock	8–12
Washington:			
Eastern	Late summer and fall	Grain, live stock	6– 8
Western	Spring and fall	Live stock, lumber, fish canneries	6– 8

[1] From *Second Annual Report of the Federal Reserve Board*, p. 381.

commission. Incidentally Oklahoma is a state that receives a very high percentage of its loans from the outside. Our figures show that two-fifths of the farm-mortgage capital in Oklahoma is obtained from life insurance companies. On the other hand, if you take a state like Alabama you will find that the total cost is 9.4 per cent, as against 8.4, in Oklahoma, but the average annual commission is seven-tenths of 1 per cent, and that the nominal charge is 8.7 per cent. Alabama is a state which receives relatively little money from the outside; it is dependent largely on what capital it has at home.

(*Selection 227 on p. 707*)

228. BANK RATES TO THE FARMER[1]

By JESSE E. POPE

Holmes estimates that in 102 counties of Illinois 921 banks afford two-thirds of all the personal credit obtained by farmers and that in Vermont the farmers obtain 70 per cent of their credit from the banks, while in the southern states of Virginia, Georgia, Arkansas, and Mississippi they get from two-fifths to three-fifths of their credit from the banks. For the country as a whole, outside the South, he estimates that from one-half to seven-tenths of the credit to farmers comes from the banks.

Contrary to a common opinion, banks are no respecters of persons, and if the farmer pays more for his credit than other classes of producers, it is because it is more expensive to loan to him. As a rule this is the case. In the first place the credit required by the farmer is very different from that required by the merchant. The term is longer, renewals are more frequent, and partial payments are unusual. While the moral risk is good, payments are slow, supervision is more difficult, and the average size of the loan is smaller. Although the farmer's current account deposits have shown a decided increase in the last twenty years, they are not of sufficient importance to warrant the bank in loaning to him against his balance.

Since the average farmer receives his income in lump sums and at infrequent intervals, he makes savings deposits rather than current account deposits. The merchant, on the contrary, receives his income in daily increments, which he immediately puts at the disposal of the banks through current account deposits. Since, therefore, as the banker would say, the merchant is borrowing his own

[1] Adapted from *Quarterly Journal of Economics*, XXVIII, 726–27.

money, he is entitled to a somewhat lower rate than the farmer. In a community mainly agricultural the large amount of interest paid on time deposits imposes a heavy burden on the banks. In the South and in the newer states of the West, time deposits usually bring 5 per cent and often 6 per cent interest, and as long as such rates must be paid to attract and hold free capital in the community, just so long must the bank's borrowers feel the burden of high interest rates. Finally, since the credit demands of the farmer are not evenly distributed throughout the year, the bank often has idle money which it must invest in short term commercial paper at a rate lower than that charged the farmer for his loan. This is not, however, as is often stated, discrimination against the farmer, for if the bank did not invest in such paper, he would have to pay a still higher rate for his loan.

D. Making Interest Rates by Law

229. USURY LAWS AND THEIR ENFORCEMENT

In order to keep the rate of interest from becoming excessive most of the states have put on their statute books laws prohibiting the charging of rates above a certain amount, generally not less than 6 nor more than 10 per cent, though 12 per cent is permitted in several of the western states. Such legislation is open to the objections that apply to all attempts to make prices by law. If the conditions of supply of, and demand for, loan funds are such as to strike their equilibrium at a figure higher than the one named in the law, that rate will be charged in spite of its prohibition. Lenders have devised countless subterfuges which make the taking of the excess interest fairly safe, and they are protected by the fact that the borrower is loath to make complaint under the law, because such action will only make his condition worse, by making it impossible for him to borrow at all.

In the fall of 1914, the Comptroller of the Currency undertook an investigation of national banks, to learn whether they were in the habit of charging usurious rates of interest. He found that the practice was decidedly prevalent, especially in the Southwest. In his report he cites particularly three national banks in small towns in Oklahoma, which averaged 25, 36, and 40 per cent, respectively, on all their loans, and two of them ran as high as 147 and 300 per cent, respectively, on individual loans. Oklahoma had at the time a usury law forbidding rates in excess of 10 per cent. The state has since

endeavored to strengthen that law, and the Comptroller has recommended that an amendment be made to the national bank act, authorizing the Department of Justice to bring suit in such cases instead of leaving it to the customer who has paid the excess rate.

230. "AN EFFECTIVE USURY LAW"[1]

By JOHN FIELDS

Far be it from me to do or say anything to hinder the folks from getting any kind of a law against usury that they think they want. The "30-day" special session of the legislature has surely by this time "done its do." And I shall be very happy indeed if the result will be that no Oklahoma farmer will ever again pay interest at a rate higher than 10 per cent and that 6 per cent or less will be the average rate. I confess, however, that I have little expectation of adding to my store of happiness from that source.

It has always seemed to me that farmers would better go fishing than to try to do much business on money borrowed at a rate of interest higher than 10 per cent. The only purpose for which borrowing money at such a high rate holds any hope of profit is for the purchase of a cow, a sow, and a dozen hens. These will work it out, if given care and fed home-grown feeds. But those who borrow money at 10 per cent or more to buy cattle to be fed or wintered, or to pay for food supplies which might have been grown on the farm, should not expect legislation to confer prosperity upon them. Make 10 per cent your own limit. Stop right there and go out of business before you start instead of later as you surely will.

Of course, it wouldn't do at all to suggest that the law taxing moneys and credits may have something to do with high interest rates in Oklahoma. Every man's bank account is supposed to be taxed. Compare the total of the bank deposits returned for taxation with the total bank deposits as shown by the next consolidated statement of state and national banks in Oklahoma. This law brings very little revenue and it transfers many large bank accounts from banks in Oklahoma to banks in other states. Men who have a lot of money don't like to get mixed up with an Oklahoma tax ferret, so they put the money where he can't find it. But this is a fine looking law and must be preserved as an ornament to the statute book.

But might it not help interest rates a little to give the private citizen an even break with banks in the business of lending money on

[1] An editorial in the *Oklahoma Farmer*, February 10, 1916.

personal property? Banks pay taxes on their capital stock and surplus. They do not pay taxes on loans. The individual depositor is supposed to pay taxes on his deposit in the bank, but the bank's taxes are not increased when it lends the funds represented by that deposit. But if the depositor makes the loan instead of the bank making it, he must pay taxes on that loan or dodge the tax ferret, and the borrower must pay taxes on the property mortgaged to secure that loan. A farmer cannot lend money to his neighbor on the same terms that the bank can make the same loan. Ten farmers cannot pool their resources and make chattel loans to their tenants or neighbors without having to pay taxes on them. But these ten farmers may start a bank with $10,000 capital and lend the rest of their money and all they can get from other folks, and escape taxation upon all of it except the $10,000. It may be good politics to fine a farmer for saving money and lending it to his neighbor but it doesn't look like good business.

Two earnest and sincere men came to see me some days ago. They are farmers and believe that practically all human ills may be corrected by the right kind of legislation. We talked things over. One of them admitted that he grew his first garden and potatoes for home use in 1915. And he had been farming for 20 years. He said that in his locality he was the only farmer who did that much toward making the farm produce the living. And we all agreed that at least half of the financial troubles which Oklahoma farmers have are of their own making and cannot possibly be remedied by any sort of laws.

XIV

RURAL CREDITS

Introduction

Undoubtedly a careful study of the rural credit institutions of Europe is an important aid to us in working out better arrangements for the United States. That does not mean that we should devote all our time to reading the inspiriting accounts of what has been accomplished somewhere in Germany or somewhere in France by *Landschaft* bank or co-operative credit union. Before we shall evolve a satisfactory working system for American farmers, we must gain a deep and intimate acquaintance with our many differing local situations, and learn how to operate the old institutions better if they are still serviceable, as well as learn how to get the greatest efficiency from such new institutions as are coming into the field.

The present chapter, therefore, aims to go back a step in order to examine the manner in which our rural credit problem has come to its present posture, and the way in which credit needs have been met (however imperfectly) up to the present time. Sections A and B serve to give us a little perspective on the problem by taking us back over the last generation, showing how farm indebtedness began and how private money lenders, merchants, and banks have been serving or exploiting the farmer's imperative need of capital.

Taking these sections with the one that follows (C), it appears that there has been a considerable development of these agencies in recent years. This reveals the present problem as not so much one of fashioning from whole cloth some new type of rural credit institution, but rather the conserving and co-ordinating task of standardizing the practices, enlarging the vision, and perhaps integrating the organization of agencies already established in a position of usefulness. Section C shows several important points at which this work of rehabilitation has already made distinct progress. As to just what direction it should take or how far it should go, opinions differ, of course. Section D has space only for two of the issues—co-operation and state aid.

Undoubtedly the greatest difficulty in the farmer's position in the past has been due to his lack of ready access to the loan markets of the

world and the relatively unmarketable form in which his securities were presented. Now that agriculture is taking its place in the business world on an even footing with other industries, the farmer must learn to compete with other users of capital. The growth of small country banks, aided now by the federal reserve system goes far toward giving him an adequate machinery for personal credit or short time loans. The Federal Farm Loan act provides an essentially similar—and thoroughly American—device for making the investment capital of the whole country accessible to the farmer for land mortgage purposes. If this machinery can be coupled up with vigorous, self-reliant, and co-operative activity on the part of those who need credit in their agricultural enterprises, we may hope, in time, to see a large part of the difficulties of this transition era disappear.

A. The Coming of the Rural Credit Problem

231. AGRICULTURAL DEPRESSION AND THE INCREASE OF FARM MORTGAGES[1]

By J. R. ELLIOTT.

Probably no better proof of the loss of the farmer's relative capital power is required than in his growing dependence for his capital on the successful men of other occupations. And it certainly is an unquestionable indication of coming disaster, if this demand for aid by the farmer be growing faster than the increase in the value of his possessions. Fifty years ago farm mortgages were rare in America; today they are the rule in many localities and everywhere they threaten to defy the farmer's efforts to contend with the load they create.

It is claimed of New England that at least $33\frac{1}{3}$ per cent of the farms are mortgaged to the capitalists. Few undertake to deny this startling declaration. In fact, it is generally admitted. Mr. Heath, Commissioner of Labor Statistics of Michigan, has recently reported on the mortgage indebtedness of the farmers of his state. He stated that he has reports from 90,803 farms, or 58 per cent of all the farms in the state. The assessed valuation of all farms reported is $194,854,663, upon which there is a mortgage indebtedness of $37,456,272, or a little more than 19 per cent of the total assessed valuation, and

[1] Adapted from *American Farms, Their Condition and Future*, pp. 45-52. (G. P. Putnam's Sons. Copyright by J. R. Elliott, 1890.)

nearly 47 per cent on that of the farms mortgaged. The assessed valuation of the farms in the state is $335,378,025, upon which the estimated mortgaged indebtedness is $64,392,580, with an annual interest charge of $4,636,265 on farms alone.

The opinion of the Labor Commissioner of Michigan, that the mortgages upon the farms of that state operate "as a mammoth sponge" upon the labor of the owners, is the growing feeling of the majority of farmers all over America—the older parts at least. Says a southern journal: "Think of it! In as prosperous a state as Michigan 47 per cent, or nearly half, of the farms are mortgaged. In Georgia, if one would take the trouble to examine the clerk's office in the different counties, a condition of affairs equally bad, perhaps worse, would be brought to light."

The Bureau of Labor Statistics for the state of Illinois has issued reports which show that the farm lands of the state have mortgages upon them to the amount of $123,733,098, not including Cook County. According to the report of the Commissioner, "the mortgage indebtedness of farmers for borrowed money has increased 23 per cent since 1880 in this state, *twice the increase in the value of farm lands*." As to Nebraska, official reports do not indicate a happy condition of affairs in that state in reference to this matter. The reports of 1887–88 deal with 215 farmers scattered all over the state. An analysis of these reports shows that, of the 215 farms, 113 are mortgaged. Seventy-five per cent of the farms of Dakota are mortgaged for an aggregate amount of $50,000,000.

The *New York Times* of December 27, 1886, contained a long article from Mr. Frank Wilkeson on the condition of the farmers of Kansas. He said: "It is a financial impossibility in this era of agricultural competitive warfare for a farmer of average intelligence and skill who tills a farm of 100 acres of land, except corn land, to lift a mortgage of say $1,000, with money earned by growing staple crops. And nine-tenths of all the uplands lying west of the ninety-seventh meridian are utterly unfit to produce corn, excepting in excessively wet seasons." The picture given of life on Saturday in a Kansas town is certainly a startling one: "It matters not how dull the town has been during the week, on Saturday the streets are crowded with people; on that day chattels are sold to satisfy the overdue mortgages. At present these sales are numerous in the West, outside of the corn belt, and a very large portion of these do not realize sufficient to pay the mortgages."

"Mr. Henry M. McDonald, president of the Traders' Bank, Pierre, South Dakota, estimates that the volume of western-mortgage business, confined chiefly to Kansas, Nebraska, Minnesota, and Dakota, has reached the sum of $150,000,000 yearly. It may exceed his figures. That it is of great magnitude is evident from the fact that in all eastern cities (and in most of the towns and villages) are located numbers of agents who make a living from the commissions paid them for securing loans. Boston numbers more than fifty agencies of farm-mortgage companies. It is computed that Philadelphia alone negotiates yearly more than $15,000,000 on western loans. Kansas and Nebraska have 134 incorporated mortgage companies. The companies organized under the laws of other states, but operating in these two states, increase the number at least 200. In this reckoning no account is taken of firms and individuals, although a large amount of money is directly invested by lenders of this class." One feature of importance to be observed in this mortgage business, is the fact that the chief part of the power to put in bonds the lands of America comes not from the country, but from the city; while the country is gaining no equivalent power over city interests of any kind.

As to the oppressive nature of the western farm mortgages the *Chicago Times* says: "The syndicates that loan money at from 1 to 3 per cent per month are mainly made up of Scotch, English, and New England capitalists, who have their agents throughout the South and West. These mortgages are falling due, and soon an immense number of southern and western farms will be in the hands of foreign mortgagors. The territories are covered with mortgages on new farms not yet patented. In many districts half the settlers borrow money at high interest to pay the small price required by the government in proving up. This is leading to widespread disaster. The object of the pre-emption law is perverted. Eastern and foreign capitalists get the land with such improvements as the settler has put upon it. The settler loses all by reason of the exorbitant interest he is compelled to pay."

There are those who would fain establish the idea that these growing financial embarrassments upon the farms of America are "an evidence of thrift rather than the contrary." Borrowed capital has, no doubt, enabled many western farmers to push their enterprises with a success which they, probably, would not have obtained without it. But the payment of the interest on western farms, with wheat at 80 cents per bushel, is quite a different matter, as compared with the

time when this cereal commanded a price 30 per cent higher. It was a different matter when the lands yielded an average of 30 bushels of corn to the acre, as compared with 20 bushels now—when heavy outlays for fertilizers are required to secure a crop.

Farm mortgage is a comparatively new disease with the agriculturists of America. Fifty years ago, the farmer who was obliged to put a mortgage on his farm was considered next to insolvent, and its clearance was thought highly improbable. They are so numerous now that their increase is hardly noticed by the rural communities. But I believe that at the present day not more than 50 per cent of mortgaged farms are released, except by change of ownership.

232. THE CENSUS REPORT OF 1890 ON FARM MORTGAGES[1]

Farm and home proprietorship and indebtedness were made the subject of statistical investigation in the Eleventh Census by special act of Congress. No previous census had undertaken a similar work. It was due primarily to the efforts of Mr. B. C. Keeler, of St. Louis, Missouri. In 1889, at a meeting of the St. Louis Single Tax League, he offered a resolution requesting the Superintendent of Census to undertake the investigation covered by this report. The idea was at once taken up, and various farmers' and labor organizations invited to co-operate in the work. "An Address to the People of the United States" was sent to every labor, religious, and agricultural paper in the country, and to the weekly editions of the great daily newspapers. Several boards of trade, the Patrons of Husbandry, the Knights of Labor, the Farmers' Alliance and Industrial Union, and many religious bodies and labor organizations indorsed the movement and joined in requests to Congress to authorize a thorough investigation of mortgage indebtedness in the United States. To these requests Congress promptly acceded.

VALUE AND INCUMBRANCE OF FARMS

Value.—The farms cultivated by owners and subject to incumbrance number 886,957,[2] and the value, as reported, is $3,054,923,165. New York has a larger aggregate value of such farms than any other

[1] Adapted from "Report on Farms and Homes: Proprietorship and Indebtedness," *Eleventh Census of the United States*, 1890, pp. 3–143.

[2] There were, in addition, 2,255,789 farms free of mortgage cultivated by their owners and 1,624,433 hired farms. It was not thought practicable to attempt to secure statistics as to the incumbrance of this large class of tenant farms.—EDITOR.

state, and its amount is $309,352,398; Iowa being second, with $305,658,669; and Illinois third, with $285,706,170. More than two-thirds of the value of this class of farms in the United States is found in the North Central division, and 4.63 per cent of the total value is in the South Atlantic and South Central divisions.

Incumbrance.—Upon the owned and incumbered farms there is an incumbrance amounting to $1,085,905,960, and there are two states in which the amount is at least $100,000,000, namely, New York, with $134,960,703, and Iowa, with $101,745,924. There is an incumbrance of $98,940,935 in Illinois, and an amount not less than $50,000,000 nor more than $75,000,000 in each of the states of Kansas, Michigan, Missouri, Ohio, Pennsylvania, and Wisconsin. In the 3 states, Illinois, Iowa, and New York, 30.91 per cent of the incumbrance is concentrated; 51.01 per cent in the 6 states, Illinois, Iowa, Kansas, New York, Ohio, and Pennsylvania; and 71.37 per cent in the 10 states, Illinois, Iowa, Kansas, Michigan, Missouri, Nebraska, New York, Ohio, Pennsylvania, and Wisconsin. The smaller amounts are found in the Southern states and the Rocky Mountain region.

There are 4 counties each having an incumbrance of $6,000,000 and over: Monroe County, New York, and Berks, Chester County, and Lancaster County, in Pennsylvania. The last named is the most prominent tobacco-raising county in the United States, and shows a farm incumbrance of $8,160,269.

Ratio of incumbrance to value.—While the amount of incumbrance unpaid at any time is fixed by contract and by law, the value of the incumbered farm is not so fixed and can only be expressed as a matter of opinion until it is sold and its value measured in money. The average time during which a mortgage on a farm endures from the date of its making to the date of its final payment is about 5 years, and the opinion is commonly expressed that during the 5 years previous to 1890, farm values, independent of new improvements, declined in many counties. Correspondence that was had with farmers in the pursuit of information leads to the belief that farm owners did not allow for the depreciation of value. A frequent answer was that there was no sale for the farm, but that its old value would some day be restored or that there was little sale for farms at any price, but that the farms ought to be worth what they had been worth some years previous. The correspondence justifies the impression that the farmers rated their farms at the older values when higher than present ones.

The incumbered farms that are cultivated by owners are incumbered to the extent of 35.55 per cent of their value, and the percentage varies among the states and territories from 24.23 per cent in Utah to 54.44 per cent in Mississippi. In 2 states the percentage is greater than 50; in 3 states between 45 and 50; in 14 states and 1 territory between 40 and 45; in 6 states between 35 and 40; in 18 states and 1 territory between 30 and 35; and below 30 in 2 states and 1 territory.

OBJECTS OF INCUMBRANCE

Real estate purchase and improvements.—The purchase of real estate, uncombined with any other object, induced 60.63 per cent of the farm debtor families to incur 64.38 per cent of the farm debt; real estate improvements, uncombined with any other object, induced 6.79 per cent of these families to incur 4.53 per cent of this debt; and real estate purchasing and improvements, in combination, induced 3.98 per cent of these families to incur 5.31 per cent of this debt. Among the geographical divisions the North Atlantic division is the most prominent as having the largest percentages representing the purchase of real estate when uncombined with any other object. The Western division has the lowest percentage for purchase money, standing alone, but it has the highest percentage for real estate improvements, standing alone, namely, 9.86 per cent for farm debtor families and 6.36 per cent for farm incumbrance.

Business.—As an object of farm incumbrance business stands for 1.62 per cent of the farm debtor families and 1.95 per cent of the farm incumbrance; in the South Atlantic for 4.13 per cent of these families and for 4.73 per cent of this incumbrance; in the Western division for 3.56 per cent of these families and 3.84 per cent of this incumbrance; in the South Central division, 2.43 per cent of families and 4.84 per cent of incumbrance; North Atlantic division, 1.76 per cent of families and 1.98 per cent of incumbrance; North Central division 1.32 per cent of families and 1.49 per cent of incumbrance.

Personal property.—The purchase of farm machines, domestic animals, and other personal property accounts for 2.77 per cent of the farm debtor families and 1.19 per cent of the farm debtor incumbrance; from the Western division, with 3.41 per cent of families and 1.77 per cent of incumbrance, to the South Central division, with 0.92 of 1 per cent of families and 0.60 of 1 per cent of incumbrance.

Farm and family expenses.—This is distinctly the "calamity" class, but perhaps every incumbrance that has been admitted to this

OBJECTS OF DEBT EXPRESSED AS PERCENTAGES OF FAMILIES OCCUPYING FARMS INCUMBERED FOR THE GIVEN PURPOSE AND PERCENTAGES OF INCUMBRANCE INCURRED FOR THE GIVEN PURPOSE

States and Territories	Purchase of Real Estate or Improvements on Real Estate		Business		Farm Machines, Domestic Animals, and Other Personal Property		Farm and Family Expenses		All Other Objects	
	For Families	For Incumbrance	For Families	For Incumbrance	For Families	For Incumbrance	For Families	For Incumbrance	For Families	For Incumbrance
The United States	71.40	74.22	1.62	1.95	2.77	1.19	5.89	2.83	2.64	2.80
Arkansas	42.67	41.97	1.51	5.27	1.45	1.30	48.88	35.34	1.24	1.14
California	63.90	62.65	3.70	3.87	1.75	0.64	6.85	2.94	3.48	3.41
Colorado	57.42	60.49	2.24	2.50	4.07	3.26	5.29	3.46	2.52	2.96
Georgia	33.60	37.00	3.05	6.68	2.05	0.36	44.00	28.35	2.69	4.09
Illinois	79.17	82.03	1.14	1.24	2.10	0.65	4.49	1.48	2.66	2.44
Iowa	79.43	79.22	0.63	0.70	2.00	1.10	2.83	1.32	2.28	2.13
Kansas	52.01	52.01	1.12	1.54	3.34	2.20	7.16	4.23	2.51	2.38
Kentucky	71.05	62.25	5.57	10.97	1.72	0.87	12.30	8.74	2.51	2.78
Louisiana	58.02	31.30	2.04	3.00	1.06	0.15	28.03	31.73	2.96	6.12
Massachusetts	78.40	79.07	1.81	2.08	1.58	0.62	5.14	2.90	4.78	5.07
Michigan	75.41	79.58	1.37	1.54	4.28	1.29	4.78	2.30	2.02	2.06
Minnesota	65.99	68.11	1.17	1.26	4.39	2.51	6.16	4.09	1.21	1.15
Mississippi	13.22	13.78	0.41	0.72	0.08	0.03	21.60	10.26	0.09	0.05
Missouri	72.26	72.74	2.29	2.87	4.18	2.51	5.98	2.66	2.53	2.91
Montana	47.64	47.77	4.60	5.92	8.52	13.49	8.28	5.25	3.80	3.35
Nebraska	57.05	60.02	0.62	0.91	3.78	2.30	4.47	2.68	1.31	1.30
Nevada	53.67	51.65	5.96	7.22	1.83	1.36	4.13	2.53	8.72	6.66
New York	84.88	86.01	1.54	1.61	0.71	0.25	3.22	1.38	3.21	2.99
North Carolina	52.31	49.39	10.15	13.55	2.13	0.83	32.91	31.44	2.06	3.61
Ohio	78.28	77.86	1.59	1.83	1.32	0.44	3.73	1.67	4.15	4.79
Oregon	61.82	65.01	3.20	3.81	4.13	2.61	7.15	3.61	3.60	3.59
Pennsylvania	80.15	81.61	1.98	2.30	1.19	0.37	2.98	1.20	3.63	3.54
South Carolina	41.28	32.29	1.00	2.10	0.44	0.42	42.08	37.30	1.24	1.72
South Dakota	38.34	38.77	1.46	1.68	6.51	4.64	9.96	7.77	1.54	1.48
Tennessee	77.44	71.44	2.48	4.61	1.34	0.57	10.67	7.21	1.57	2.35
Texas	93.99	82.84	0.58	0.96	0.16	0.44	0.10	0.06	0.10	0.49
Utah	59.12	55.54	9.05	9.52	9.05	11.38	7.54	4.31	4.02	2.58
Virginia	59.79	49.33	4.93	6.36	1.42	0.44	15.14	12.05	8.09	15.58
Wisconsin	74.76	80.47	1.50	1.68	4.50	1.42	4.84	2.17	1.90	1.73
Wyoming	46.85	31.83	2.74	2.93	6.57	10.88	4.11	2.51	2.47	1.76

(For economy of space, several states have been omitted from the foregoing table. Such states do not, however, differ from states in the same section, which are included in the table.—Editor.)

class would not be considered an evidence of calamity, as, for instance, when a parent mortgages his farm or home to give his son a liberal education. The two geographical divisions embracing the Southern states are the most prominent ones with respect to farm incumbrances made on account of farm and family expenses. In the South Central division, 18.73, and in the South Atlantic division 18.15 per cent of these families incurred 13.35 and 11.29 per cent of the farm debt for these expenses. By contrast, in the North Atlantic division 4.00 per cent of these families incurred 1.59 per cent of this debt. The average for the United States is 5.89 per cent of families and 2.83 per cent of incumbrance.

The table on p. 719 sets forth these facts concerning the objects of incumbrance, classified by states.

233. FARM INDEBTEDNESS IN THE UNITED STATES[1]

By JESSE E. POPE

It may be broadly stated that previous to the last quarter of the nineteenth century American farmers felt little need of credit. They had been given their land by the government or had bought it at comparatively low prices. Since agriculture was extensive, expenditures for improvement and equipment were inconsiderable. The virgin soil needed no fertilization, and credit was seldom required except for family supplies during the crop growing period.

The western movement, which began to assume large proportions about the middle of the nineteenth century, resulted in the opening of vast areas of fertile land adapted to grain growing and of free grazing land on which livestock could be raised at low cost. This resulted in a tremendous surplus of agricultural products, which, owing to the development of railroad and ocean transportation, was thrown on the markets of the world, bringing prosperity to the farmers of America and ruin to those of Europe.

Partly as a result of this overwhelming flood of production and partly on account of the speculation and inflation which followed the Civil War, a great increase in land values took place. This gave farmers a broader basis for borrowing and they took advantage of it to make improvements and to add more land to their farms. Tempted by the high rates of interest and deceived by the reported endless

[1] Adapted from the *Quarterly Journal of Economics*, XXVIII (August, 1914), 702–26.

wealth of the new West, eastern and European capitalists made loans altogether too freely and often on the security of land practically worthless or located in regions of uncertain crops. The upward movement culminated in the early '90's; grain farming reached its climax and over-production brought the inevitable fall of prices and of land values.

Farmers now began to feel the burden of their great mortgage indebtedness, which had grown enormously during the preceding decade and which had been incurred largely for unproductive purposes. Many could not pay their interest, and as it often happened that the selling price was less than the amount of the mortgage, foreclosures were common. This collapse caused widespread discontent among the farmers and a total mortgage indebtedness of farms operated by their owners estimated at $1,085,995,960, in 1890.

The census of 1900 did not secure data on farm indebtedness, but the census of 1910 secured information regarding the amount of mortgage indebtedness on farms operated by their owners. The result was a total debt of $2,293,000,000—110 per cent greater than the debt of similar farms in 1890. When land values increase, ownership becomes more difficult, and the increase of mortgage indebtedness is inevitable. During the period 1890–1910 the value of land and its improvements for the country as a whole increased 100 per cent, and this, coupled with frequency of land transfers, resulted in a great increase of mortgage indebtedness.

The farmer has also made heavy expenditures to raise his standard of living and has spent large sums on improvements and equipment and in working capital. The value of buildings shows an increase of 77.8 per cent from 1900 to 1910. During the same decade value of implements and machinery increased 68.7 per cent, while the expenditure for labor increased 82.3 per cent, and that for fertilizer, 115 per cent. These increased expenditures for equipment and operation are the result of the normal development of agriculture, since they arise out of a growing necessity for greater intensity of cultivation. Animals are of better quality and require better housing. More thorough cultivation calls for a larger expenditure for labor or increased employment of machinery. Declining soil fertility may force the farmer to resort to artificial fertilizer. It is possible that these added items of expense may not be reflected in increased production and must, therefore, be wholly met out of an increase in prices. But should such an increase in prices not take place, the additional

expenditures would have to be met out of the farmer's capital, which must ultimately increase his mortgage indebtedness.

The writer is not of the opinion that the average mortgage indebtedness of the American farmer is excessive. In a country so rich agriculturally, a mortgage debt of $2,793,000,000 is no cause for alarm; and in general, an increase of the agricultural indebtedness of a country is usually a sign of prosperity. But it is a sign of prosperity only if the increase of land values on which the additional mortgage debt is based has been caused, not by speculation or by an abnormal rise in the prices of products, but by an actual increase in the volume of production. It is essential not only to the welfare of society in general but also to the security of the farmer himself that any increase in the returns from agriculture shall have resulted mainly from an increase of production rather than from high prices.

As to personal indebtedness, there has been no general investigation into the situation of the American farmer. Holmes estimates it as follows: chattel mortgages, $700,000,000; liens on crops other than cotton, $450,000,000; cotton crop liens, $390,000,000; unsecured debts, to local merchants, $250,000,000, and other unsecured debts, $410,000,000. With regard to its source personal credit may be classified as: (*a*) merchant's credit, including store credit, dealer's credit and factor's credit; (*b*) bank credit.

The practice among storekeepers of selling to farmers goods to be paid for after the harvest is almost as universal as agriculture itself. It is less prevalent in regions of diversified farming, where the farmer, from the sale of eggs, poultry, milk, etc., has a weekly income available for ordinary household expenses. There exists, however, in the South, a far more important form of store credit. The local merchant not only gives credit for the ordinary family supplies, but in reality finances the growing crop—contracting to make a definite loan to be taken in commodities. A bank, however, often lends the merchant the money for buying the supplies to be advanced to the farmer. As an inevitable result of the expense and risk of granting this form of store credit, its cost is high, and the system undoubtedly lends itself to grave abuses. With the development of economic sense, it is declining; but without such credit independent farming would have been impossible for a large part of the southern farmers.

The substitution of expensive machinery for labor is a marked characteristic of American agriculture, and a large part of this machinery is supplied on credit by the manufacturer, who takes the dealer's

or the farmer's notes and in case of need discounts them, sometimes at the farmer's own bank but more often at some metropolitan bank.

In factor's credit the loan is made, not in supplies but in cash, though the purpose for which it is to be used is rigidly prescribed. In the South the cotton factor advances the farmer the money for financing his crop, and the farmer contracts to plant a certain number of acres of a certain crop, cotton for example, and to sell his crop to the factor. In the North a livestock commission firm advances money to the farmer for the purchase of livestock, which he contracts to sell through the firm.

The extent to which bank credit is used by American farmers varies widely according to the economic development of the community. Where agricultural methods are well established and climatic conditions are such as to preclude the probability of crop failure the farmer enjoys practically the same credit advantages as the merchant. Farms are comparatively large and therefore the loans are of sufficient size to make it worth while for the banks to grant the accommodation, and our system of free banking has permitted the establishment of banks wherever they could be made to pay.

B. Farm Credit Institutions of the United States

234. MORTGAGE BROKER AND MORTGAGE COMPANY[1]

By JAMES WILLIS GLEED

The western mortgage business was begun by individual brokers, who invested on their own judgment, based on personal knowledge of borrowers and securities. Their profit lay in the margin between the low interest capitalists would accept and the high interest borrowers would pay. Capitalists sent their money for investment, and mortgages were made to them directly, so that the brokers required no capital. The business of bringing borrower and lender together has always been profitable. The broker of the community becomes the capitalist of the community. The western mortgage brokers have been no exception to the rule. One of them in Kansas has made nearly $10,000,000 since 1870. The business developed rapidly. As increased capital has become necessary, individual brokers have given way to corporations. There are probably two hundred such corporations

[1] Adapted from the *Forum*, IX (March, 1890), 94–105.

now operating in Nebraska and Kansas alone. While the individual broker confined his operations to his own and adjoining counties the corporation took states for its field, established local agents, and adopted the plan of taking all mortgages in the company's name. Then the process of securing a loan would be about this: the borrower applies to the local agent, who requires him to fill out and sign and swear to the truthfulness of an "application," in which he sets forth the exact description of the property offered as security; how much of the land is under cultivation; when he bought the land and how much he paid for it; what improvements are upon it—fences, houses, barns, cribs, etc.; the cash value of the improvements; the present cash value of the land; the crops of the previous year and the current year; the rental value; the location of the land with reference to railroads, towns, schools, churches; the assessed valuation; the tax thereon; the cattle on the premises; the purpose for which the money is borrowed; the total valuation of the borrower's property, real and personal; the state of the title. In a word, he is made to give all the information which can be of any conceivable use in determining the value of the real and personal security offered. Then the local agent and two or more disinterested residents indorse on the application a sworn appraisement of the land. The application is sent to the company, and an agent from the home office is sent out to inspect and report. If his report is favorable, a bargain is struck as to the rate of interest, which is usually the lowest rate that will float the security in the East at par; and as to the amount of the commission, which is the company's profit. As to the payment of the commission, various plans are in use. The most profitable method is this: out of the proceeds of the note and mortgage the negotiator receives all the expense of making the loan, and his commission. For many years this commission was enormous. The companies located at St. Paul, Omaha, Des Moines, Kansas City, St. Joseph, Topeka, Denver, or Dallas, sometimes received as high as a 15 per cent commission on a five-year loan, and for many years the home company never received less than 10 per cent. The local agent exacted all that he could above this amount. Another custom as to commission is to secure it by notes and a second mortgage. This commission is usually made payable in ten semi-annual instalments. On default in the payment of one instalment, the whole sum becomes due.

Embodied in the note or mortgage are all conceivable provisions for the protection of the lender. Interest is made payable semi-

annually, and is represented by interest coupons that bear interest from maturity at the highest legal rate. The borrower assures the payment of the taxes, and agrees to keep the buildings insured for the benefit of the mortgagee. On default in the payment of interest or in the performance of any of the agreements of the note or mortgage, the lender may declare the whole amount of principal and interest immediately due. Such being the contract, other sources of profit besides the initial commission will immediately be perceived. The transaction may have such a history as this: the first interest coupon is paid; the second is defaulted. The company remits to the eastern investor, and then declares the whole debt due on account of the default. The borrower wishes to pay up and have the loan reinstated. The company then collects the amount of the defaulted interest, with interest compounded thereon at the highest legal rate and a further commission, or bonus for reinstating or renewing the loan. Or perhaps the company insists upon payment of principal and interest. In that case, the borrower borrows elsewhere; the company is paid in full; the amount is reinvested, earning another 10 per cent commission; and the new mortgage is sent to the investor and the old one canceled. The borrower who for any reason desires to pay off his mortgage before it is due, must do so on such terms as the company may prescribe. He cannot treat directly with the eastern owner of the mortgage, for he cannot ascertain who that owner is; the assignment from the company to the investor is not recorded. The borrower is usually allowed to anticipate his obligation on payment of a bonus of 2 per cent per annum for the unexpired time.

Of course it is not always to the interest of the company to take advantage of a default. The security may be so large as to cover principal and interest for the entire term of the mortgage. In such case, should taxes be unpaid, the company will either redeem in behalf of the owner, or buy at the tax sale for itself. In the former case, the amounts paid for taxes under the terms of the mortgage will bear the highest legal rate of interest. In the latter case, such amounts will, under some statutes, bear interest at the rate of 24 per cent.

If a foreclosure becomes necessary, the company secures it at the lowest possible cost—at a wholesale cost. In case of foreclosure, if it has not guaranteed the loan, the company is in this position: it can repay the debt and interest to the eastern investor, who is always ready to receive it, and itself take the land; or it can leave the land

in the hands of the investor. This option, in case of non-guaranteed loans, has been made a source of considerable profit to some companies. Many companies, however, adopt the invariable rule of taking the land. The best and most conservative companies have made large profits by the sale of lands, by themselves taking title to all foreclosed tracts.

Various means have been adopted for negotiating these securities in the East. As stated above, the mortgage is sometimes made directly to the investor; sometimes to the company, and then assigned. In the latter case, it is sometimes assigned without guaranty, sometimes with a partial guaranty, and sometimes with a full guaranty. Of late, what is called the debenture system has been much in vogue. The company issues its own promises to pay, and secures them by assigning to a trustee bonds and mortgages whose par value somewhat exceeds the face value of its promises.

The eastern investor in western mortgages runs some risks. Speculative values will often be given to farm land at first in a new country, before experience has determined its real interest-earning value. This has been shown in many counties in eastern Kansas and Nebraska, where values are now lower than when settlement was first being made.

Again, the mortgage-loan company itself is constantly in danger of being imposed upon. Many local agents work on commission. Their earnings depend on their making loans, and the size of the commission depends upon the size of the loan. Local agents and examiners from the home office are sometimes bribed to overvalue the land. The sworn appraisement by householders resident in the county where the land lies by no means secures in every case what it is meant to secure. The dishonest borrower always knows who in the community entertains the wildest notions about the future of his county or town, and this man makes the sworn appraisement; and there is a wide difference between the appraisal made by really honest men "for loan purposes," and the appraisal made by the same men in their actual buying and selling. Bad loans made and foreclosed injure good securities by throwing upon the market properties to be sold below their real productive value.

The risk of the investor from failure of title is small. The titles are simple. With few exceptions, they may be traced directly from the federal government. Every investment company employs an attorney to examine titles to the properties that are to be pledged,

and the western states generally have by statute simplified conveyancing as much as possible. Descriptions are simple and definite. An exceedingly large proportion of these mortgage investments, as compared with investments of like magnitude in other lines, is entirely safe.

Certain eastern investors have already adopted the plan of hiring trustworthy salaried agents, to make and to take care of their loans. This plan is not practicable for the ordinary investor, who must depend largely on some trusted middleman. It is first in order, therefore, to select an honest and capable broker. Here and there may be found a private broker who has clear notions of duty toward his correspondents; who makes investments for others on his own judgment, based on personal knowledge; who is content with a fair profit himself; and who can truthfully say that he has never lost a penny of his clients' money. When such a man can be found, he is a treasure. His honor is of a higher sort than the honor of most corporations; and, doing a business which is strictly under his own personal supervision, he is less likely to be imposed upon by dishonest borrowers. In judging of a loan company, a number of points should be kept in mind. What is its history, and how long has it been in existence? Are its methods of placing money the best? Does it do business in a safe territory? What is the standing of its officers and stockholders? Where do its officers and stockholders reside? Does it offer high rates? Does it give good reasons for offering high rates? Does it guarantee its loans? If so, is it because the loans are good, or because the guaranty is worthless? How is it regarded by the people among whom it makes its loans?

Let it be remembered that, because the business has proven very profitable, many wild-cat companies have been formed within the past four or five years. Such companies, managed by irresponsible and inexperienced men, have invested much money. They are ready with their guaranties and they offer high rates, but there is no soundness in them. Tempted by high commissions, they have loaned largely in excess of the security, so that the settler who desired to go farther west, or to return to the East, could realize more money upon mortgage than upon sale. The wild-cat company runs a brief but pernicious course. It demoralizes borrowers, plunders investors, and seriously prejudices legitimate mortgage business.

The chief objection to what is called the debenture system is that companies are likely to secure their debentures by a poorer class of

mortgages. The trustee never vouches for the character of the securities upon which debenture bonds are based. He only certifies the face value. Bad securities taken for large commissions are likely therefore to be put into the hands of the debenture trustee. There is nobody to inspect or to criticize. Another objection is that the investor under the debenture system is without speedy remedy. He is part of a series. He cannot move independently. The advantages of the debenture system are that the investor is not compelled to stand or fall with one mortgage or one piece of real estate. Each debenture bond is, in a sense, insured by all the rest of the series. The debenture, too, is an absolute guaranty by the mortgage company.

The western mortgage business is the outgrowth of unprecedented economic conditions. Within a brief period, an unusual amount of capital has been devoted—not directly but indirectly, by way of mortgage loans—to the development of a vast area of agricultural country. The amount of capital advanced has been great, but not out of proportion to the results achieved. The purpose was legitimate, and not of the nature of a South Sea Bubble. Great advantages have resulted to the settlers, the brokers, and thus far to the capitalists. Losses to capitalists have been small, compared with losses in other lines of investment. Present conditions and future prospects seem to justify caution, but not alarm.

235. SOME MORTGAGE COMPANY OFFERINGS[1]

J. A. B. Coupon Notes $5,000.00

A series of Ten (10) coupon notes, in denominations of $500.00 each, dated January 19th, 1916, maturing January 19th, 1921; bearing interest at the rate of 6½% per annum, interest payable semi-annually to the ——— Trust Company, ———, Texas; all equally secured by first mortgage to the ——— Trust Company on 241 acres of land in W. County, Texas, about eight miles southeast of W.

The land is all under good fence, wire and post. About 50% of it is good, black, waxy soil; the balance is black sandy loam—all good, rich soil. About 150 acres are in cultivation, probably 60 acres being put in for the first time this year. Of this cultivated land, about 75 acres were originally black waxy prairie, now in good state of cultivation; about 75 acres were originally bottom timber land, probably 30 acres put in cultivation in 1915, the balance being put in this year. The tract is practically level; has one small drain or slough running through it, which adds materially to the drainage.

[1] From the current advertisements of two prominent companies.

The improvements consist of three, three-room box tenant houses and one, two-room box house, recently completed.

Mr. B. states that it is his intention to put the entire tract in cultivation except probably 25 acres, which he will use for pasturage and wood for tenants.

The place is watered by wells. The tract lies in Caney Valley, but is not subject to overflow.

Improved lands in this vicinity sell at $60.00 to $100.00 per acre. Our appraiser considers this tract worth $45.00 per acre, or a total of $10,845.00.

We offer these notes at par and accrued interest, accompanied by our written guarantee.

——— & CO., BANKERS

Founded A.D. 1858

FARM MORTGAGE INVESTMENTS

The Farm Mortgages described herein repesent conservative Loans on improved farm lands in the best agricultural districts of the United States. They are just plain old fashioned Farm Mortgages covering producing farms that are able to earn more than the overhead for interest and taxes besides making a living for the borrower and leaving a surplus to apply on the debt.

We allow investors ample time to investigate the security and examine the papers in a Loan if they desire to do so. There is no difficulty in quickly ascertaining information regarding the security and the borrower. The country is well supplied with Banks wherever choice lands are found, and the bankers will always gladly respond to inquiries as to conditions, values and all matters of interest to investors. In case a Mortgage is found to be not as represented we will repurchase it or substitute another.

We will collect and remit principal and interest without any expense to investors, and generally look after a Mortgage during its existence as if it were our own property.

This House was founded in 1858, and has passed through all the financial panics and business depressions of the last half century. We have consistently and conservatively adhered to one kind of investment—Farm Mortgages. During this period we have loaned many millions of dollars for other people, and up to this time no purchaser has ever lost a dollar on a Mortgage purchased of this House. Our service is an assurance to investors that all essential details of the title and security have been carefully scrutinized before a Loan is made. Our dealings with clients are private and are held in strict confidence.

We offer these Loans, subject to previous sale, but have others on hand of similar character and can substitute in case of prior sale.

Complete information regarding the security and terms will be furnished upon request.

FIRST MORTGAGE FARM LAND BONDS

In order to supply the demand for small investments we have provided Coupon Mortgage Bonds in denominations of $500 and $1,000. These Bonds are all equally secured by first Mortgages on productive lands in Illinois and Iowa without any preference or priority of lien of one Bond over another. The security is of the same character as described in the within list.

Orders by telegram may be made at our expense. Reservations may be made for future delivery if desired. Please order by number.

ILLINOIS AND IOWA FARM MORTGAGES

No. 2637—$10,000, 5%, due March 1st, 1921. This Mortgage covers the borrower's home farm of 160 acres in Iroquois County, Illinois, valued at $36,000. It is improved with good buildings, and the soil is a black sandy loam, all tillable, and will produce good crops of grain. We have known the borrower a long time and have always found him prompt and satisfactory in all his dealings with us. This Mortgage was originally for a larger sum, and he has gradually reduced it to the amount of this Loan.

No. 2620—$15,000, 5%, due April 1st, 1921. This Mortgage covers the home farm of the borrower consisting of 360 acres in Mitchell County, Iowa, located two miles from a good market town, and valued at $70,000. It is well improved with new and substantial buildings. Similar land in this neighborhood rents from $6.00 to $8.00 per acre. The borrower is considered a good moral risk.

No. 2626—$6,500, 5%, due January 1st, 1921. This Mortgage covers 127 acres of land in Linn County, Iowa, located one mile from the nearest town, and valued at $28,000. This is the borrower's home place and we understand he has refused this amount for his farm. Similar land in the neighborhood rents from $6.00 to $8.00 cash per acre. The borrower is an old resident of this community, and comes to us well recommended by his banker.

No. 2621—$6,000, 5%, due January 1st, 1921. This Mortgage covers a splendid quarter section of land in Mahaska County, Iowa, valued at $32,000. The buildings are fair. The borrower owns 1100 acres of land in this neighborhood all worth at least $200 an acre and clear of indebtedness. He is an old citizen of this County, and bears an excellent reputation.

NORTHWESTERN FARM MORTGAGES

The following described Mortgages cover going farms in the best farming districts of Idaho and Oregon. These farms will more than earn the overhead for interest and taxes, besides making a good living for the borrower and leaving a surplus to apply on the debt.

No. 607—$2,000, 6%, due May 1st, 1920. This Mortgage covers a farm of 69 acres in Fremont County, Idaho, valued at $5,630. There are 67 acres tillable and 60 acres under cultivation. The soil is rich and the neighborhood is excellent. The borrower owns 80 acres adjoining this land, which is farmed in connection with this place. The farm is well stocked and the improvements are adequate.

No. 1790—$2,500, 6%, due November 1st, 1920. This Mortgage covers a farm of 640 acres in Bonneville County, Idaho, valued at $8,700. 100 acres are in fall grain, 40 acres in barley, 30 acres in stubble, 330 acres in tillable pasture and the remainder in rough pasture. The improvements consist of a small house, barn and granary. The borrower bears a good reputation.

No. 526—$900, 6%, due March 1st, 1920. This Mortgage covers 40 acres of land in Canyon County, Idaho, located 2½ miles from the nearest market town, valued at $2,600. There is a small house and barn on this place valued with the land. This farm produced a crop valued at $1,000 in 1914. The mortgagor owns 330 acres of land adjoining this farm, and comes to us well recommended.

No. 564—$1,200, 6%, due April 1st, 1920. This Mortgage covers 240 acres of land in Power County, Idaho, located 2½ miles from the nearest market town, and valued at $4,925. There are 200 acres tillable and 135 acres under cultivation. The soil is excellent and raises heavy crops. This money was borrowed for improvements, and will be used to put up a new house and barn. The borrower is a good farmer, and is improving his place rapidly.

No. 602—$1,500, 6%, due May 1st, 1920. This Mortgage covers a farm of 150 acres in Boise County, Idaho, located 1½ miles from the nearest market town, and valued at $4,350. This farm is all tillable and 125 acres are under cultivation. The soil is a dark sandy loam and very productive. The borrower bears a good reputation for thrift and industry, and will use part of the money borrowed for improvements.

236. INVESTMENTS OF LIFE INSURANCE COMPANIES IN FARM MORTGAGES[1]

By ROBERT LYNN COX

On December 31, 1914, American life insurance companies held over $1,700,000,000 in real estate mortgages, and their ratio to other assets has been steadily increasing in the last ten years. Statistics covering 98¼ per cent of all the outstanding mortgages of American

[1] Adapted from a report submitted December 9, 1915, at the Ninth Annual Meeting of the Association of Life Insurance Presidents and printed in the *Proceedings*, Vol. IX.

companies show that 39.03 per cent of the total amount was on United States farms, 59.24 per cent on other real property in the United States, and 1.73 per cent on real estate elsewhere.

The proportion of mortgage loans on farms varies all the way from thirteen-hundredths of 1 per cent in the Middle Atlantic group of states to 86 per cent in the Northwestern group, the average for 148 companies in America being 39.72 per cent of their total United States mortgage loans. In general it will be noted that in the Eastern states the amount loaned on farms is negligible, that in the Central, Northern, and Southern groups the farm loans rise to considerable amounts, but it is in the great Southwestern and Northwestern sections, whose agricultural development in the last fifty years has been so marvelous, that the great bulk of the life insurance farm loans have been placed. On the other hand we find that over half of the loans on real property, other than farms, have been placed in the populous commercial and manufacturing sections of the New England and Middle Atlantic states, which contain very nearly half of such property values of the entire country.

The relation of farm loans made by life insurance companies to total farm loans as given by the United States Census of 1910 (the latest available estimate) is shown in Table "B."

It should be said in explanation of the amount of farm loans given by the Census of 1910, that the enumerators included the data only of mortgaged farms *occupied by the owner*, so that mortgages upon rented farms were left out.

It contains also a column showing the savings bank deposits in each state for reference later.

A very interesting fact is brought out by this table, viz., that while the amount of farm mortgages reported by the Census in the New England and Middle Atlantic states is more than twice as great as the amount in the South Atlantic and Gulf and Mississippi Valley combined, the life insurance companies have loaned less than $1,000,000 in the New England and Middle Atlantic states, while they have loaned over $40,000,000 in the South Atlantic and the Gulf and Mississippi Valley. The obvious explanation is furnished by the column showing savings bank deposits. The local accumulations of savings bank and private capital have taken care of the demand for farm loans in the older and more populous sections of the country, leaving the life insurance funds contributed in large part by these sections free to flow under economic law into the newer sections where

TABLE "B"

AMOUNT OF TOTAL OUTSTANDING FARM MORTGAGES IN THE UNITED STATES AS GIVEN BY THE CENSUS OF 1910, AMOUNT OF FARM MORTGAGES HELD BY 126 AMERICAN LIFE INSURANCE COMPANIES DECEMBER 31, 1914, AND AMOUNT OF SAVINGS BANK DEPOSITS JUNE 30, 1914

	Farm Mortgages Reported by U.S. Census, 1910	Savings Bank Deposits, June 30, 1914	Life Insurance Farm Loans, 1914	
			Amount	Per Cent of Census Figures
New England:				
Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut	$ 58,535,508.00	$1,543,121,525.30	$ 104,875.00	.18
Middle Atlantic:				
New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia	197,124,813.00	2,253,737,250.83	827,171.47	.42
Central Northern:				
Ohio, Michigan, Indiana, Illinois, Wisconsin	459,886,968.00	279,830,222.71	116,800,717.55	25.39
South Atlantic:				
Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida	54,798,664.00	51,600,550.49	20,433,173.11	37.29
Gulf and Mississippi Valley:				
Alabama, Mississippi, Tennessee, Kentucky, Louisiana	68,719,944.00	49,309,863.17	20,870,348.27	30.37
Southwestern:				
Missouri, Arkansas, Texas, Kansas, Colorado, New Mexico, Oklahoma	317,376,816.00	10,314,118.02	187,204,378.15	58.98
Northwestern:				
Iowa, Minnesota, Nebraska, North Dakota, South Dakota, Wyoming, Montana	440,044,686.00	257,295,956.26	284,118,815.99	64.5
Pacific:				
Washington, Oregon, California, Nevada, Idaho, Arizona, Utah	129,685,452.00	500,507,745.03	16,601,908.04	12.8
Total American	$1,726,172,851.00	$4,945,717,231.81	$647,083,487.58	37.48

the local supply of capital is inadequate to meet the needs of rapidly developing communities. How great this assistance of life insurance companies has been to these sections is shown by the fact that their outstanding loans December 31, 1914, amounted to $64\frac{1}{2}$ per cent of the farm loans reported by the Census of 1910 in the Northwest, 59 per cent in the Southwest, 37 per cent in the South Atlantic, and 30 per cent in the Gulf and Mississippi Valley states.

We have already said that about 40 per cent of the mortgages held by life insurance companies were on farms, while 60 per cent covered other real property. This might suggest the thought that life insurance funds had been invested disproportionately as between these two classes of securities. However, the average per cent of values loaned on farms for the whole country is 1.859 per cent, while on the other hand the companies have loaned but 1.259 per cent of the values of other real property. While companies have loaned to the amount of $3\frac{1}{3}$ per cent of the estimated farm values in the great agricultural section, they have loaned less than 2 per cent in the manufacturing and commercial sections on other real property values. Furthermore, while life insurance companies have made nearly 40 per cent of their mortgage loans on farms, only a little over 30 per cent of the total realty values of the country are in farms, so that favoritism, if any, has been shown in behalf of farm loans as compared with loans on other kinds of real property.

A careful examination of Table "F" will show a close and apparently a very direct connection between high average farm values and low interest rates. It appears that there are thirty-one states in which farm land values average $20.00 or over per acre. In eighteen of these the average interest rate on farm loans is 6 per cent or less. There are seventeen states in which farm values average less than twenty dollars per acre. In eleven of these states the average interest rate on farm loan is over 6 per cent.

Other things being equal, the states in which up-to-date enterprising farming leads to good buildings, well-stocked farms, good crops (farming with profit), are those which attract capital and secure low interest rates. If "other things" are not equal, if there are antiquated laws as to titles, transfers, and foreclosures, or statutes intended to circumvent the operation of economic law, the flow of capital may easily be turned aside and interest rates thereby increased.

TABLE "F"

FARM MORTGAGE LOANS OF LIFE INSURANCE COMPANIES, DECEMBER 31, 1914

Amount of Mortgage Loans on Farm Property Held December 31, 1914, by 126 American Life Insurance Companies, Whose Total Mortgage Loans Amounted to 97 Per Cent of All Mortgage Loans Held by American Companies, with the Average Rate of Interest Received in Each State, Arranged by States in the Order of Amount Loaned

STATES, IN ORDER OF AMOUNT LOANED	FARM LOANS BY INSURANCE COMPANIES DECEMBER 31, 1914		ESTIMATED FARM VALUES, UNITED STATES CENSUS, 1910	
	Amount	Average Interest Rate	Land Average per Acre	All Farm Property
Iowa	$139,511,101	5.32	$82.58	$ 3,257,379,400
Nebraska	62,390,393	5.34	41.80	1,813,346,935
Kansas	60,395,448	5.46	35.45	1,737,556,172
Missouri	58,406,800	5.35	41.80	1,716,204,386
Illinois	49,941,759	5.16	95.02	3,522,792,570
Indiana	47,014,148	5.31	62.36	1,594,275,596
Minnesota	33,981,293	5.36	36.82	1,262,441,426
Texas	32,242,856	6.99	14.53	1,843,208,395
Oklahoma	28,056,308	5.91	22.49	738,677,224
South Dakota	26,950,777	5.44	34.69	1,005,080,807
North Dakota	18,142,658	5.88	25.69	822,656,744
Ohio	16,588,937	5.30	53.34	1,654,152,406
Georgia	14,828,323	6.28	13.74	479,204,332
Tennessee	9,386,015	5.56	18.53	480,522,587
California	8,736,255	6.42	47.16	1,450,601,488
Kentucky	6,282,692	5.41	21.83	635,459,372
Arkansas	3,851,605	6.99	14.13	309,166,813
South Carolina	3,377,477	6.47	19.89	332,888,081
Colorado	2,945,316	6.92	26.81	408,518,861
Montana	2,900,458	7.29	16.74	251,025,930
Idaho	2,754,254	8.53	41.63	245,065,825
Mississippi	2,719,824	6.99	13.69	334,162,289
Washington	2,391,781	6.97	44.18	571,968,457
Wisconsin	2,003,744	5.53	43.30	1,201,632,723
North Carolina	1,475,010	5.79	15.29	456,624,607
Louisiana	1,379,502	7.64	17.99	237,544,450
New Mexico	1,306,042	7.55	8.77	111,830,999
Michigan	1,252,126	5.41	32.48	901,138,299
Utah	1,192,602	8.74	29.28	117,545,332
Oregon	1,107,912	6.66	35.23	455,576,309
Alabama	1,102,313	7.34	10.46	288,253,591
Virginia	645,450	6.00	20.24	532,058,062
Maryland	423,000	5.84	32.32	241,737,123
Arizona	407,602	7.20	33.97	47,285,310
Pennsylvania	331,156	5.75	33.92	1,041,068,755
Wyoming	241,933	7.71	10.41	97,915,277
Connecticut	75,050	5.26	33.03	138,319,221
Florida	66,004	6.00	17.84	118,145,989
Delaware	45,100	5.97	33.63	53,155,983
West Virginia	40,907	5.70	20.65	264,390,954
New Jersey	16,965	6.00	48.23	217,134,519
Vermont	13,775	5.26	12.52	112,588,275
Nevada	11,500	8.00	12.99	39,609,339
New York	10,950	5.56	32.13	1,184,745,829
Massachusetts	10,100	5.19	36.69	194,168,765
Maine	5,950	5.80	13.73	159,619,626
New Hampshire			13.70	85,916,061
Rhode Island			33.86	27,932,860
Total	$646,961,371			$34,801,125,697
Averages		5.55	$32.40	

The striking fact brought out by table "G" is that while the average rate of interest on farm loans in each group of states is higher than the average rate of interest on loans secured by other real

property, in the great Central Northern and Northwestern sections, where the farm values are highest, the difference between these two classes of loans is smallest. Indeed, we found, on examining the figures of individual companies loaning on all kinds of real property, that a large number had secured in these sections a higher average interest rate on their city and village loans than on their farm loans.

TABLE "G"

	Loaned on Farms by Life Companies, 1914	Average Interest Rate on Farm Loans	Amount Loaned on Real Property Other Than Farms by Life Companies, 1914	Average Interest Rate on Other Real Property	Combined Average Both Classes
New England	$ 104,875.00	5.00	$ 18,387,384.79	4.68	4.70
Middle Atlantic	827,171.47	5.79	598,336,948.65	5.03	5.03
Central Northern	116,800,717.55	5.20	118,533,747.23	5.00	5.13
South Atlantic	20,433,173.11	6.00	43,982,393.37	5.58	5.74
Gulf and Mississippi Valley	20,870,348.27	5.89	26,543,483.69	5.49	5.72
Southwestern	187,204,378.15	5.74	58,966,102.81	5.23	5.62
Northwestern	284,118,815.99	5.40	46,094,188.83	5.29	5.38
Pacific	16,601,908.04	7.00	67,603,321.44	5.24	5.94
Totals	$647,083,487.58		$978,447,570.81		
Averages		5.55		5.13	5.29

While we have not been able to prepare complete statistics on the subject, an examination of the total mortgage loans of nine companies, seven of which loan chiefly or wholly on farm property, compared with nine other companies, seven of which loan wholly or chiefly on city property, shows that the average size of farm loans is about $2,500, while the average size of city loans is about $75,000. When it is considered that the work incident to inspecting the property, examining titles, preparing the papers, collecting interest, seeing that taxes are paid, etc., is much the same for each loan, regardless of its size, we find a very obvious economic explanation of why farm loans, generally speaking, are required to pay a somewhat higher rate of interest than loans upon other kinds of real property.

It appears that life insurance companies, collectively, are very much the largest owners of farm mortgages in this country, their holdings exceeding by about 20 per cent the total farm loans held by the 26,765 banks of this country. As to the farm loans reported by the United States Census in 1910, it would appear that the life insurance companies hold about 37½ per cent, the banks about 31½ per cent, private investors, colleges and other institutions combined about 31 per cent. As we have already noted, life insurance companies have placed nearly 40 per cent of their mortgage loans on farm

property while the *value* of farm property is only a little over 30 per cent of the value of *all* real property of the country. Any preference they have shown for farm loans, however, is more than offset by the preference the banks have shown for city loans, about 84 per cent of their mortgages being on city and village property, which comprises less than 70 per cent of the total real estate values of the country.

237. DRAINAGE BONDS AS A FORM OF AGRICULTURAL CREDIT[1]

By TOM K. SMITH

For years and years different sections of this country have been borrowing money and issuing bonds for the purpose of reclaiming and protecting wet and overflowed lands. In Missouri we have been consistently marketing such bonds for fifteen years; the issues aggregate millions of dollars and are not only favorably received by our clients but are purchased without hesitation. The record of payment is so satisfactory that investment bankers in our state do not consider their lists complete unless they contain one or more such offerings. The same condition exists in almost every other state in the Mississippi Valley and in many other communities where splendid local markets for drainage bonds have been developed and where the buying competition is decidedly keen.

Very little effort has been necessary to sell the supply of drainage bonds in the local markets, and dealers have not been inclined to do the exploiting necessary to create a general market for their securities. As a rule, the single issues have not been large and have been so favorably received that nearly every one has been exhausted before outside investors could familiarize themselves with the offerings. Fifty thousand dollar and $100,000 issues have been the rule; $200,000 issues were considered large and an issue of $1,000,000 was exceptional.

With the proceeds of these bonds wonderful results have been achieved; some of the most fertile and productive agricultural communities depend entirely upon artificial drainage constructed with the proceeds of bond issues. Encouraged by these successes, more extensive improvements have been undertaken and larger bond issues authorized; so large, in fact, that a broader market has been necessary.

[1] Adapted from a paper delivered at the Fourth Annual Convention of the Investment Bankers Association of America, Denver, September, 1915, and printed in the *Proceedings* of that convention, pp. 120–30.

We have been forced to exploit drainage bonds and to offer them in the general market. Until this year, local capital has been sufficient to finance all Missouri drainage bond issues, but the supply has increased to such an extent that we have been compelled to interest outside dealers and investors. Since January 1 approximately $10,000,000 of drainage bonds have been issued in the state of Missouri alone, and, when you take into consideration that our market is expected to furnish funds with which to finance improvements in several of the southwestern states, you can realize why it has been necessary for us to interest outside capital. In spite of the misgivings with which the first offerings were received, the result has been entirely satisfactory and today leading investment bankers are selling drainage bonds in large quantities and crying for more; in fact, the competition for good issues is almost as keen as it is for direct obligations.

Inasmuch as the reclamation and protection of wet and overflowed land is a public improvement, the different legislatures have authorized the organization of drainage districts for this purpose or have provided that the work may be done under the supervision of existing governmental agencies. The owners of land in a defined area, suffering from the effects of water, decide to improve this land by the construction of canals and such other works as are necessary. A petition is prepared in accordance with the provisions of the statute and filed in the proper court. After notice has been given of the pendency of this petition, a hearing is held at which the court considers the case and decides whether or not the drainage district is a public benefit and should be organized. In case of an affirmative decision a decree or judgment is rendered, creating the district, and such steps are taken as are necessary to provide an administrative body. Landowners may appeal from this decree within a certain and limited time, in which event the proceedings are reviewed by a higher court.

When the officials of the district are elected or appointed, they organize as a board of directors, elect officers, choose an attorney, and employ engineers, and take such other steps as are necessary to complete the organization. With the proceeds of preliminary taxes authorized by law, or with money borrowed on notes of the district, surveys are made and a definite plan of improvement is decided upon. When this plan has been approved by the court benefits and damages of the proposed drainage works are distributed among the owners of

the land affected. The assessed benefits represent the increased value which the law contemplates will accrue to the lands because of the improvement and, after confirmation, they become the basis of taxation for the purpose of paying the cost of the improvement. To provide the funds with which to construct the improvement, bonds, in most cases, are issued by the district. These bonds ordinarily yield from $5\frac{1}{2}$ per cent to 6 per cent, are general obligations of the district, and are payable, both principal and interest, by taxes levied upon the real property against which benefits have been confirmed and in proportion to the same. In most cases the provisions authorizing the issuance of drainage bonds are very favorable and provide for serial maturities in substantial amounts within the reasonable life of the improvement. In some states the entire issue must mature within fifteen years; in others the limit is twenty, twenty-five, or thirty years, but twenty years is the rule, with substantial payments beginning as soon as the benefits are received.

Draining or improving land by removing water or preventing overflow, confers a special benefit which can be estimated with a reasonable and satisfactory degree of certainty; hence it is equitable and proper that drainage taxes should be levied in proportion to the benefits and not in proportion to the value. An improved farm, located on the edge of a district, requires less drainage and receives less benefit than a piece of land which is covered by water all or a substantial part of the time.

When drainage bonds are issued, the district pledges itself to provide for the payment of the principal and interest by making such tax levies as are necessary. In most cases the total tax is levied and becomes a fixed lien upon the property, the district agreeing and binding itself to levy and collect certain annual instalments which will be sufficient to meet the requirements for principal and interest. In other cases the total tax is divided into instalments and set out for the various years, the annual instalments being extended against each tract of land.

The following concrete examples are interesting:

Twenty years ago a drainage district embracing 50,000 acres of land was organized; bonds aggregating $85,000 were issued and the work completed. Although the engineers and officials had had practically no experience in such work, this improvement resulted in practically all of the land in the district being opened for cultivation. At the time the district was organized the land was worth not more than

$10 per acre, which furnished sufficient security for a debt of less than $2 per acre. By supplementing the drainage with additional work, an efficient system was produced. At the present time all of this land is in cultivation and is worth from $75 to $150 per acre. The bonds matured serially from two to fifteen years, the interest was always promptly paid and the different instalments retired at maturity. The taxes amounted to but a few cents per acre, were not burdensome, and were gladly paid. I watched the payment of these bonds and the development of this land with a great deal of interest because it furnished a concrete example of the organization of a drainage district, the completion and satisfactory maintenance of the work, and the prompt payment of the principal and interest of the bonds. At the present time the district is out of debt and its excellent record is a justification of the issuance of drainage bonds and their purchase by conservative investors.

Another district, organized fifteen years ago, embraced 100,000 acres and issued $200,000 of bonds maturing within twenty years. The work was completed promptly, has been efficiently maintained, and the land is in cultivation and covered with substantial improvements. Although but five instalments of the bonds are outstanding the district has surplus funds to cover the last two instalments and will probably only collect three additional tax levies. Fifteen years ago this land was worth $15 per acre; today the average value is at least $100 per acre.

Another district, organized five years ago, embraced 45,000 acres of land and issued $350,000 of bonds. The drainage system is complete and 75 per cent of the land is in cultivation. Five instalments of the tax have been paid without controversy and three serial maturities of bonds retired, leaving fifteen more to be cared for. At the present rate, all of the district should be in cultivation within two or three years, and it is evident that the remaining taxes will be promptly paid so that the bonds may be retired on or before maturity. Since the organization of this district the land has doubled in value.

The merits of drainage bonds are obvious. They present a combination of highly advantageous features. It is, therefore, only a natural result that they should be attractive to investors desiring a bond payable by taxation, free from income tax, and yielding a higher rate than is offered by direct obligations. These qualities insure a great demand. We can also foresee the supply for this demand

because it is claimed that 25,000,000 acres of land in the Mississippi Valley alone await improvement by drainage. I, therefore, commend the drainage bond to your careful consideration.

238. CREDIT EXTENSION BY THE IMPLEMENT DEALER[1]

An important feature of the harvesting-machine industry was the development at an early date of an elaborate system of distribution by the manufacturer. The principal explanation for this early development is to be found in the fact that the most important agricultural sections of the country were to a large extent recently settled, and the farmers were comparatively poor. Moreover, the credit facilities of the chief farming sections of the country were not adequate, apparently, to the need of agricultural development; the farmer, especially the new settler, was often unable to pay cash for the machines that were absolutely essential to the successful working of his farm, but, if furnished with such machines, was in a position to pay for them in instalments from the proceeds of his crops. Manufacturers who produced and sold for cash would have, therefore, a limited market, while those who could give credit would greatly enlarge their sales. From these circumstances developed the practice, particularly among more successful manufacturers, such as McCormick, of selling their machines to the farmers on credit, the trade being conducted through retail dealers, who became local agents for the manufacturer for their respective localities. The usual form of payment made by the farmer for such machines was a part payment in cash at the end of the harvesting season and a promissory note or notes for payment of the balance in one or two annual instalments. Such notes were generally guaranteed by the retail dealer who acted as the local agent for the manufacturer.

The system of giving long credits to the farmer for purchasing reaping machines was established by Cyrus H. McCormick at the beginning of his business early in the fifties, or about 1855.[2] It has been continued up to the present time, and it is a fact that the harvesting-machine business gives longer credit to the farmers than they receive from the manufacturers of any other goods they buy.

[1] Adapted from the *Report of the United States Commissioner of Corporations on the International Harvester Co.* (1913), pp. 55, 281–85, 340.

[2] This whole paragraph is taken from the statement submitted by the McCormick Harvesting Machine Co. to the bankers whose aid they were trying to secure in connection with the formation of the International Harvester Co.—EDITOR.

Plows and spring tools are sold on short time or for cash. Twine is sold principally for cash in the fall of the year it is sold. The usual terms for harvesting machines are one-third in the fall of the year the machine is purchased (this is called cash), one-third the fall of the following season and one-third the fall of the second season, so that a farmer would have used the machine in three harvests before it was finally paid for. Excessive competition has extended this time until it frequently happens that a farmer has three years in which to pay for the machine after the season in which he purchased it. Competition has also brought about the undesirable feature of giving a farmer a year's time without interest when the crop conditions are unfavorable and he is not able to get full use out of his machine. It is also a custom to sell machines at the close of harvest on what are called "next year's time" without interest. That is to say, that if a farmer purchased a harvester or reaper in September of 1902, he gives his note without interest until the fall of 1903, and at that time he pays one-third cash, and one-third each in the fall of 1904, 1905. The policy of extending this long credit has worked to the advantage of the McCormick Company in some ways by increasing sales, but if the collection departments of all the various companies were managed together, many improvements upon this system could be effected by shortening the length of credit and by making the examination of the paper taken in payment more rigid.

The rates of interest which the International Harvester Co. charges on the notes it receives depend apparently to some extent, at least, on the laws of the respective states in which the business is done. The International Harvester Co. submitted the table shown on p. 743 to the Bureau, which shows in a comprehensive way the variations in this respect.

The International Harvester Co. not only perpetuated the system of selling harvesting machines on long terms of credit but also after it entered into the production and sale of various new lines, it applied the same system to them also. It is especially able to do this on account of its financial resources. Most of these new lines were formerly sold for cash or on short terms of credit. Representatives of the International Harvester Co. claim that its leading competitors grant equally long credits, and declare that its policy is to develop as far and as rapidly as possible the system of cash sales—that is, cash payment in the same season as the goods are purchased—and that discounts for cash are allowed for this reason.

While in some localities there has been a great increase in the proportion of cash sales, nevertheless, taking the business of the International Harvester Co. as a whole, it appears that the proportion of sales on long credit (i.e., one or more years) to total sales has shown an increasing tendency, especially in very recent years. This increase in the proportion of credit sales is partly due, at least, to the application of long credits on the new lines for which they were formerly uncommon.

TABLE LXXIII

VARIATIONS IN THE RATES OF INTEREST RECEIVED BY THE INTERNATIONAL HARVESTER CO. ON FARMERS' NOTES IN THE UNITED STATES, BY STATES IN 1911

State	Rate of Interest before Maturity	Rate of Interest after Maturity	State	Rate of Interest before Maturity	Rate of Interest after Maturity
Alabama	8		Nebraska	7	10
Arkansas	8	10	Nevada	8	10
California			New Hampshire	6	
Colorado	8	10	New Jersey	6	
Connecticut	6		New York	6	
Delaware	6		North Carolina	6	
Florida	8	10	North Dakota	8	10
Georgia	7	8	Ohio	6	8
Idaho	8	10	Oklahoma	8	10
Illinois	6	7	Oregon	8	10
Indiana	6	8	Pennsylvania	6	
Indian Territory	8		Rhode Island	6	8
Iowa	6	8	South Carolina	7	8
Kansas	8	10	South Dakota	8	10
Kentucky	6		Tennessee	6	
Louisiana	8		Texas	8	10
Maine	6	8	Utah	8	10
Maryland	6		Vermont	6	
Massachusetts	6	8	Virginia	6	
Michigan	6	7	Washington	8	10
Minnesota	7		West Virginia	6	
Mississippi	7	10	Wisconsin	6	8
Missouri	7	8	Wyoming	8	10
Montana	8	10			

Table LXXIV, p. 744, furnished by the International Harvester Co., shows the percentage of cash sales and credit sales to total sales of the International Harvester Co. (for its agricultural implement business) in the United States.

According to this table, the cash sales have shown, on the whole, a declining tendency, particularly in the most recent years. Data

were not available for 1903. The proportion of cash sales ranged from 74.4 per cent in 1905 to 64.2 per cent in 1911. There was, of course, a corresponding increase in the credit sales, which in 1911 reached the maximum, namely, 35.8 per cent.

TABLE LXXIV

COMPARISON OF PERCENTAGES OF CASH AND CREDIT SALES TO TOTAL SALES OF THE INTERNATIONAL HARVESTER CO. IN THE UNITED STATES, 1904–1911

Year	Percentage of Sales for Cash	Percentage of Sales for Notes and Accounts	Year	Percentage of Sales for Cash	Percentage of Sales for Notes and Accounts
1904*.....	70.9	31.1	1908.....	69.4	30.6
1905.....	74.4	25.6	1909.....	68.9	31.1
1906.....	70.3	29.7	1910.....	66.4	33.6
1907.....	67.3	32.7	1911.....	64.2	35.8

*Percentages as in original statement; do not equal 100.

Examining the amounts of notes of various maturities taken in each year, we find that notes for the longer terms have shown an almost uninterrupted decline. Thus, three-year notes constituted 14.4 per cent of the total in 1904 and only 6.5 per cent in 1911, while four-year notes sank from 2.9 per cent in 1904 to only 0.4 per cent in 1911. Practically no five-year notes were taken. For the three- and four-year notes combined, the amount taken by the International Harvester Co. was 17.3 per cent of the total notes in 1904, and only 6.9 per cent in 1911. For one-year notes the proportion taken in 1904 was 34.7 per cent and 28.9 per cent in 1911, while for the two-year notes the proportion taken in 1904 was 48.0 per cent and 64.2 per cent in 1911. Taking these two classes together, the percentage was 82.7 in 1904 and 93.1 in 1911.

The assistant general manager of the International Harvester Co. insisted, however, that the company was earnestly trying to reduce the proportion of credit sales generally. "We should be very glad," he said, "if some plan could be worked out by other interests than ours to do more of the financing of the farmer. Broadly, our policy has been to try to shorten the terms, and we have met with comparatively little success."

239. STORE CREDIT IN THE SOUTH[1]

By LEWIS H. HANEY

A majority of the tenant farmers find in the country merchant their chief source of credit; and store credit and crop mortgage arrangements form a dark place in the Texas farm credit system. Virtually all negro tenants, and 75 per cent to 90 per cent of the white tenants, foreigners and the best black-land tenants excepted, regularly depend upon advances of credit from the local storekeeper for food, clothes, and various supplies, and give mortgages on their crops as security. Probably less than 10 per cent of farm owners are accommodated in this way, and the percentage of white tenants seems to be on the decrease in most sections. The *nominal* interest rate is always 10 per cent.

The system usually works as follows: At the end of the year those who have secured advances on a crop mortgage have little or nothing left. One of them will go to his merchant about February 1, and ask for credit until he can make a crop in the fall. The merchant will agree to extend a certain amount of credit in return for a mortgage on the prospective crops of the tenant and any other property which he may own—which is often nothing. Often the acreage in cotton is considered, and whites may be allowed about $5 an acre and negroes from $3.50 to $4.00. Generally, however, the amount is not formally figured in this way, but a maximum allowance per month is set, being about $30 for whites, and somewhat less for negroes. The amount varies with the community, and may run up to from $60 to $75 a month in a German community. As low a limit as $15 may be set. It depends on the character of the tenant and the number of his teams. The aggregate amount for the season, then, is the product of the monthly allowance and the number of months, say nine months. The character of the security is indicated by a crop mortgage form which accompanies the farmer's note.

This crop mortgage system is satisfactory to no one but the dishonest storekeeper—not all storekeepers are dishonest. The interest is nearly always deducted in advance, and it is almost universally complained that the borrower is overcharged for his goods. If the farmer borrows $300 he gets only $270 in cash, and is given the worst bacon and flour at the price of the best. Once the mortgage is given, the tenant becomes the storekeeper's man; for he must depend on

[1] Adapted from *American Economic Review*, IV (March, 1914), 50–55.

credit, and all his credit is pledged. He, or his trade at least, is regarded as the possession of the merchant who holds the mortgage on his crop. Then, at the end of the season, he is not infrequently virtually compelled to sell his cotton to the storekeeper, and as a result often fails to get its full value. The same is true of the farmer's other market produce, such as chickens and eggs. The total actual interest paid under such circumstances averages at least 20 per cent. On the other hand, the tenant is often a shiftless and unreliable person and the percentage of bad debts is high. In this way a big sum of debt accumulates, and, in order to cut a long debt short, the tenant "pulls up" and leaves the country. All this is true, to say nothing of the social harm done by the continuous planting of a single crop (cotton) which the system demands.

Here someone asks, Why do farmers ever go to storekeepers? Why do they not get cash from the banks, and buy on a cash basis?

The reasons are numerous and cogent. (1) The banks do not like long loans and often refuse to make them; the tenant wants credit for nine months. (2) From August to January it is generally hard to get money at the banks; the tenant wants someone to run him through the whole year. This the storekeeper will do. (3) The banks do not want to make small loans; the tenant wants no other. (4) Too much security is required by the banks; the tenant often has nothing to pledge that is not bought on time. (5) Banks generally will not take crop mortgage security. (6) This kind of credit business requires close local supervision, even to the extent of directing the tenant's farming operations in not a few cases, and such intimate knowledge and care the banks cannot give.

In a very real way, however, the *country merchants act as the banker's agents in making crop mortgage loans*, the business being farmed out to them, as it were. From 5 per cent to 20 per cent of the loans of many Texas banks are made to country merchants, such loans being "largely" or "almost entirely" used to carry farmers on crop mortgage security. The interest paid is usually 8 per cent. As security, the merchants endorse and turn over to the banks the farmers' notes and crop mortgages. They do not, however, receive dollar for dollar on such security. In this way, indirectly, the banks carry a larger part of tenant farmers than would at first appear to be the case.

About two-thirds of the sales made by hardware and implement dealers to Texas cotton farmers are on time to be paid out of the

cotton crop in the fall. The credit price is higher than the cash price by an amount which varies with the interest rate but which may safely be put at 10 per cent. In the case of unreliable farmers and tenants, a mortgage is taken on the article sold and the purchaser gives his note.

It is probable that in most parts of central Texas over 90 per cent of those tenants who owe the store are also indebted to their landlord for larger or smaller advances. Storekeepers, as such, only give credit on food, supplies, implements, etc., whereas cash or its equivalent is often needed for mules, feed, and other current expenses. The landlord is practically always involved in supplying this cash. He may make small cash advances in a bad season; and he often sells his tenants teams and feed to be paid for out of the crop. But for larger cash advances the practice is not uniform. In the bottoms of the Brazos and Colorado, and in a few places in the "black-land belt," there are large "plantations" whose owners prefer as a rule to "accommodate" their own tenants rather than to "stand for" them with the bank or other lenders. This gives them greater control over their tenants, and unscrupulous landlords may make larger profits by charging high rates. To carry their tenants they may borrow several thousand dollars from the bank each year. Such landlords often make a business of running a sort of commissary.

On the other hand, the owners of medium and small farms in the black-land belt and sandy regions to the east do not lend any considerable amount of cash to their tenants, though they sometimes help them to borrow elsewhere. On the whole, they would rather the tenant would get his money in his own way.

240. LOANS FOR THE CATTLE-MAN[1]

By J. F. EBERSOLE

The cattle loan company, commonly referred to as "cattle bank," is a middleman between borrowing cattle-owners and lending bank-managers. Its business methods and forms closely parallel those of real estate mortgage loan companies, except for the fact that cattle loans are of shorter duration and secured by mortgages of the chattel variety. Cattle loan companies, incorporated under state charters, have been operating in such cities as Fort Worth, Denver, East

[1] From "Cattle Loan Banks," *Journal of Political Economy*, XXII (June 1914), 577–80.

St. Louis, St. Joseph, Portland, South St. Paul, Omaha (2), and Kansas City (3), some of them for over twelve years; and one of them is now being organized in Chicago. These companies have a paid-in capital stock ranging from $50,000 to $300,000, and are usually closely affiliated with a national or state bank, as are trust companies in the larger cities.

These companies are informed of desired loans through country bankers or by receipt of direct applications, the latter usually from the larger "cattle-growers." In some cases the company on its own initiative urges cattlemen in whom it has particular confidence to undertake feeding operations at a time when the beef market offers a favorable opportunity for such production. In every case a salaried examiner of the company inspects the plant and herd of the cattle-grower and his personal capacity and integrity before the granting of a loan. And thereafter the examiner, on his regular circuit, maintains a continuous inspection and volunteers advice designed to protect the value of the security given for the loan. When a loan application has been acted on favorably, a promissory note and chattel mortgage are taken. The funds of the company then advanced to the borrowers may be utilized to buy more cattle, to pay outstanding debts such as those for feeding expense, or, as is often the case, to pay for the very cattle which are pledged as security for the loan. In a few cases where the cattle-grower enjoys an exceptional credit, funds will be advanced for the full purchase price of a herd for seasonal feeding purposes, or to develop two-year-olds into finished four-year-old beef cattle. The loans granted are seldom less than 60 per cent of the known value of the cattle.

To secure a buyer for the note and mortgage is the second primary function of the cattle loan company. If the loan is a small one, usually $10,000, it may be sold entire, the chattel mortgage assigned, and the note indorsed to the buyer. If the loan is a large one, of $50,000 to $100,000, it is necessary to subdivide it in order to provide a ready sale. The mortgage and note are assigned in parts of $5,000, $20,000, or other denominations, to suit the convenience of the buyers of the paper. In this case the assigned parts, since they are indorsed by the loan company, are equivalent to a "debenture" issue secured by a pledge of specified assets held by the company for the protection of the note-holders. The size of mortgage loan most frequently made is $10,000, while loans of $100,000 are exceptional.

The business of cattle loan companies approaches closely to the functions of the commercial paper broker. The cattle loan company

has an advantage over the commercial paper broker in that the favorable location of the company—always at the receiving cattle-market of the district in which its loans are exclusively placed—enables it fully to protect its interests by claiming the proceeds of sales of mortgaged cattle. This is particularly true in the case of range cattle, which can be readily identified by the mortgaged brands.

To cover expenses of administration the cattle loan company secures for itself a part of the interest paid on the loan. The rate charged the borrower is usually determined by conditions in the locality where it is made, sometimes running as high as 10 per cent, and again, influenced by general rates for capital, falling as low as 7 per cent. From this gross interest charge a commission has to be given to the local banker who makes the loan, expenses of examination and management must be met, and an appropriation made to a contingency reserve fund to cover occasional losses incurred from the circumstance that the companies usually become surety, by indorsement, for the final payment of all the loans which they have placed with lenders. These deductions determine what may be safely paid to eastern purchasers of the paper, usually 5 or 6 per cent.

Holders of cattle paper have never suffered in times of financial panic from failure to pay at maturity. Cattle, like grain, are a cash commodity purchased by retailers and sold by them, largely for cash, to satisfy a relatively constant consuming demand. This characteristic is retained even in times of panic.

Maturities are usually six months for feeding purposes; and less often of two and one-half years for developing two-year-olds for market. This two-and-one-half-year paper is occasionally converted into the six-month variety by the sale of notes running for six months, based upon the two-and-one-half-year mortgage. These notes are taken up at maturity by the loan company and reissued or renewed for like succeeding periods until the original loan is repaid.

It is to be expected that the operation of a Federal Reserve act will cause this form of loan to increase in desirability in the near future. Eastern bankers possessing these six-month notes will probably find them readily rediscountable with the local federal reserve bank at any time up to maturity. And a considerable amount of two-and-one-half-year notes may be held to advantage, since, if properly selected with successive maturities, one-fifth of their total amount will be immediately rediscountable when necessary.

By rendering this form of agricultural paper liquid before maturity the Federal Reserve act will have become a most important influence for enlarging the amount of capital devoted to this branch of industry. Already eastern bankers have scouts touring the western states to study this form of banking with a view to investing several millions of dollars each. Interest rates upon these loans will unquestionably be reduced in time through such increased competition of lenders. The loan companies will hardly suffer, however. While charging the cattle-grower less, they will be enjoying a large turnover and should welcome this new development. The four or five million dollars placed in such loans yearly by the average loan company, as at present constituted, is but a fraction of the loans that may be placed by them within a few years. By reducing the interest cost charged to cattle-growers an important service will have been performed for the consumer. This phase of the operations of the Federal Reserve act will be of distinct benefit, and possibly the least dangerous of all forms of legislation designed to assist American agriculture.

C. Utilizing and Improving Existing Credit Agencies

241. WHAT THE FARM MORTGAGE BANKERS OFFER[1]

By F. W. THOMPSON

In touching upon the subject of "What the Farm Mortgage Bankers Offer," I shall confine my remarks principally to the facilities now at hand, and what the farm mortgage bankers have to suggest as a means of increasing these facilities for financing land mortgage loans for the American farmer. The farm mortgage bankers include country and city bankers, farm mortgage investment bankers, and individuals and co-partnerships, who do not only make farm loans for their own investment but who act as agents or brokers for the investment of funds foreign to the locality in which the loan is situated.

These foreign investments have been computed to total two-fifths of a grand total of nearly $3,000,000,000 of the estimated total of farm mortgages in force in the United States at the present date. Hostile legislation against foreign corporations, building a wall around state boundaries, has had a reversal of the objects to be accomplished

[1] Adapted from an address of the president of the Farm Mortgage Bankers' Association of America, delivered at the National Conference on Marketing and Farm Credits, Chicago, December 2, 1915, and printed in the *Bulletin* of the Farm Mortgage Bankers' Association, January, 1916.

and has resulted uniformly in higher rates for money. The competition of highly organized corporation bonded indebtedness, where, for the most part, the income tax is paid by such corporations, has to a large extent up to the present time diminished the amount of money available for farm mortgage investment.

Farm mortgage bankers have persistently battled against these obstacles and have been very largely responsible for the lowering of rates, and significantly may I state that instead of being blamed for the high rate prevailing in some sections of the United States they should be praised for their consistent endeavor to overcome handicaps imposed upon the farm mortgage borrower in the good sections. These same bankers, defined in the fore part of this paper, have negotiated nearly $2,000,000,000 of the farm mortgages in force and nearly all of the $1,200,000,000 held by insurance companies, trust companies, and savings banks of the United States, which latter volume of business represents the lowest average rate paid by farm borrowers in all sections of the United States. This may be a surprise to some people who have an erroneous idea that the farm mortgage banker is gouging the life out of the American farmer.

There seems to be a general impression abroad that, in our country, the mortgage debt of the American farmer was forced upon him and that he is suffering a tremendous handicap by virtue of this indebtedness. If one would but stop to think, he would soon come to the conclusion that this impression is wholly wrong and without foundation. Instead of being a burden, it has been the chief cause of our wonderful agricultural development. The business of farm mortgage banking is quite the reverse of other banking activities in that the lender seeks the borrower to a much greater extent than in any other line of banking. If one would stop to consider the rate of interest paid under present conditions as compared with the flat rate contemplated in proposed legislation (and I am now talking about the great bulk of mortgages, where after making liberal allowances we may assume that the rate paid by the borrower in the comparatively highly developed agricultural sections would not exceed $6\frac{1}{4}$ per cent), it can readily be seen that the contemplated saving will not exceed $\frac{1}{4}$ of 1 per cent per annum, 6 per cent being the proposed flat rate. By computing land values on the basis of $100 per acre, which is a fair average for lands in the better sections of the United States, and assuming that these farms are encumbered to the extent of 50 per cent of their value, or at $50 per acre, the annual saving *per acre* would be exactly $12\frac{1}{2}$ cents.

In the sections where higher rates and lower valuations prevail, and where a much lower volume of loans is in force, we will assume that the difference in savings would be 3 per cent per annum, or 75 cents per acre based on loans not exceeding $25 per acre on a $50 per acre valuation.

There are those who would have us believe that the difference in saving to the farm mortgage borrower under the present farm mortgage banking system and under that proposed in the various bills in Congress is the sole barrier between him and unbroken prosperity; that the 12½ cents per acre saving in the one case here used and the 75 cents per acre in the other represents the difference between poverty and affluence with the man on the farm. Such argument is not only fallacious, but is extremely feeble and tends to befog a true understanding of conditions as they exist today in the United States. Greater stress might profitably be laid upon correcting evils as to methods of management and costs of production on the farm, before attempting to reduce interest rates on farm mortgages in the face of conditions that do not warrant such reduction. Better farming methods, less waste, and systematized marketing facilities will be followed by lower interest rates as surely as day follows night and not before. The development of our agricultural sections in the East and Middle West, as compared with the South and West, amply demonstrates this theory.

I have witnessed the average in unit loans in Iowa and Illinois grow from $3,000 to $8,000 in ten years. Ten years ago it cost the borrower from 3 per cent to 5 per cent commission above the basis rate spread over a period of five years, or ⅗ per cent to 1 per cent per annum, or a gross of from $90 to $150 on a $3,000 average size loan, and at present the gross commission rate paid rarely exceeds 2 per cent and is somewhat lower in a great many cases or in amounts ranging from $80 to $160 for a loan of $8,000 covering a like period of time or ⅕ per cent to ⅖ per cent per annum. It costs as many dollars to make a $1,000 loan as it does to make one for $10,000, and it is not reasonable to expect that the rate of commission will be as low in districts where loan units average $1,000 to $2,000 as in that district where the limit is five to ten times as great. There is some need of reform in the cost of appraisement, while it must be admitted that as the hazard increases, the more frequent must be the inspection and investigation, and consequently a greater cost per unit. It must also be admitted that it costs more to convince investors of the

desirability of loans arising in districts not quite as standard as in the agricultural districts known as the corn belt.

Farm mortgage bankers have a sincere appreciation of the difficulties confronting the serious minded people who are concerned with the future of the homeless tenant. A great many people think in average sized terms of acreage approximating 160 acres in contemplating land that should be purchased by the homeless tenant.

Tenancy is with us in all farming sections and is growing with alarming rapidity in our best developed sections. It is useless to think of tenants, without considerable money in hand, buying land in 160 acre or larger units when prices for land run from $75 to $250 per acre.

Protracted periods of drouth and rainfall and other elemental disturbances amplified by crop pests, sickness in the family, etc., make the hazard great and no one should seriously think of promulgating a system of rural credits based upon mortgages taken to finance such purchases and issue bonds against them, unless they were protected by a state or government guaranty, which guaranty in turn would have to have behind it a cash fund of sufficient magnitude to protect the investor in such a bond against defaults from whatever cause. The constitutionality of such a guaranty, however, is a grave question.

It seems, therefore, that until the homeless tenant acquires a fund large enough to pay or obtain credit to permit him to pay at least 50 per cent of the purchase price of land desired, he must be dismissed from participating in any scheme of long credit such as is now contemplated. As discouraging as this may seem, there is a way out of the dilemma in my opinion, if we can get our homeless tenant to think in terms of smaller acreage and to think in terms of intensive instead of extensive farming. Instead of thinking of 160 to 320 acre farms, start on a 5 or 10 acre farm close enough to a fairly good town with good school and church facilities to take care of the social needs of the family and if need be rent a small cottage in the village and work the 5 or 10 acre tract for all it can produce.

Right here is where the building and loan association can do the service it does in building homes for salaried people living in small villages and towns, and if the man and his family have the right kind of stuff in them they will soon have accumulated enough with what help the building and loan association can give them, and be glad of the chance, to erect a comfortable home and otherwise improve the property as the case may require. Small acreage property under a

high state of cultivation is about as salable a proposition as can be found and the hazard of loss to both the owner and lender is reduced to a minimum.

Farm mortgage bankers are concerned principally in long term mortgage credit. They have had years of experience ranging from ten to fifty years in granting this kind of credit. There have been failures in this line of business just as in all other business ventures, but I think I am safe in saying that less money has been actually lost by farm mortgage bankers for their clients than through any other line of investment securities, excepting possibly municipal bonds supported by the taxing power of our various branches of government. None of the farm mortgage bankers has grown excessively rich out of this business. It has been profitable, but not excessively so.

One of the features most prominently mentioned in proposed legislation is the predicating of mortgage loans as security for debentures issued in convenient form and maturity to attract the small investor. Most of the well meaning enthusiasts glibly say that these bonds will find a ready market and that all that is needed is to have a sort of government paternalism cast over these bonds to make them eagerly sought after by the public.

The experience of several companies doing this business has brought to light enough troubles and handicaps to cause me to say that this kind of financing should be handled with extreme caution and that the supervisory control of the government should be worked to its highest efficiency before launching this craft out upon the investment sea. Contrary to past experience, mortgages of the most superior merit regarding security and moral hazard should be the ones that should be trusteed for bond issues, rather than to countenance the practice of placing in the debenture trust such mortgages as do not in themselves possess sufficient attractiveness to find a ready market.

Knowing the business of farm mortgage banking thoroughly, both as to its strength and weakness and as to the desirability of handling and selling both mortgages and bonds the farm mortgage bankers of the United States in convention assembled at St. Louis in October, 1915, after having months of study and serious consideration regarding proposed legislation by the coming Congress, adopted the following resolutions:

This Association was formed and exists to further any action which will facilitate rural credits, whether by legislation or individual or organized

private effort. We therefore favor rural credit legislation so far as it may, without violation of the constitutional and other vital principles of our form of government, and without disregard to economic law, be effected to the common advantage of the borrowers and the lenders of the country.

The Association recognizes that there are defects and deficiencies in the facilities open to the tenant without land, or the newcomer—either immigrant or city-bred—who would go on the land. This Association applauds the efforts to help both the nation and this type of individual by financing his establishment on the land, and would be pleased to render any assistance within its power to such a movement.

In considering the phase of rural credit having to do with long term loans on the security of land the Association accepts the following fundamental propositions:

1. The object to be accomplished is to so mobilize this form of rural credit as to make it available to every land-owning farmer in the United States on terms as favorable as the market affords, consistent with the security offered.

2. To accomplish this object it is neither necessary nor consistent with the principles on which this government is founded, to lend to farmers as a class either the credit of the nation or its monies, either directly by government loans, or indirectly by subsidies or guaranties.

3. The object is, rather, attainable by removing those obstacles, legal and otherwise, which prevent the farmer's paper from reaching the investment market generally in such form, on such terms, and from such a source as to make it at least as acceptable in the matter of assured security, convenience of handling and convertibility, as any other investment of equal intrinsic merit.

This Association believes this object, once attained, would provide for the farmer:

1. Credit in quantity much greater than at present, and in quantity certainly sufficient for all legitimate purposes.

2. Credit on a basis of intrinsic security, rather than of extrinsic factors such as the special laws of any given state, the distance of the security from the source of the funds, the terms as to maturity, etc., on which it was desired to borrow the money. This result would be gradual, requiring the amendment of the state laws as to titles, collections, taxation, etc., among other changes dependent on the citizens of the states, and not on anything the federal government can do by statute.

3. Loans for long terms, as well as short terms, "straight" or serial maturity, or amortized as to principal, the latter free from renewal worries or expense.

4. As low rates of interest as the free play of supply and demand in the investment market affords, when not encumbered by the factors of lack of

confidence, lack of convenient form, convertibility, and legality for certain funds, which factors now bar the farm mortgage from a very large market. We do not believe that lower rates can be obtained in any other way, and least by arbitrarily trying to fix by statute either interest rate or margin of profit or terms of negotiation.

Any rural credit legislation which fails to utilize present farm mortgage banking machinery and seeks to establish a wholly new order of negotiating or selling agencies would be highly undesirable. The experience of farm mortgage bankers, acquired through many years of handling farm loans ought not to be cast aside without an effort to make the largest and fullest use of it.

242. THE BANKERS' EFFORT TO IMPROVE PERSONAL CREDIT IN THE SOUTH[1]

By JOSEPH HIRSCH

We hope to show southern bankers, and particularly country bankers, who advance to southern farmers, year after year, the money necessary to produce the crop, that it is a much safer and a much saner business proposition gradually to liquidate the obligations of southern farmers by the gradual sale of their crop, the banks retaining in their possession the notes of the farmers secured by the actual collateral of cotton warehouse receipts on cotton properly insured, than it is to force the immediate sale of this cotton and the immediate liquidation of the farm debts by transferring this obligation to the debit side of their ledgers in the shape of bills of exchange. That it is much safer for a country bank to have the notes of, say, five hundred farmers for $500.00 each, secured by cotton amply margined, than it is to have the same $250,000 in the shape of obligations of a few cotton speculators, imperfectly margined, and subject to a severe loss through depreciation in price.

In order to provide better facilities for the general storage of cotton, I believe that a special committee of this organization should be appointed to confer with the warehouse commissioners of the various southern states, with the fire underwriters, and with the Department of Agriculture, to the end that we may distribute plans for the construction of up-state warehouses at a moderate cost. The Texas Bankers' Warehouse Committee, in its campaign, furnished

[1] Adapted from president's report at the Conference of Cotton States Bankers, New Orleans, December 6–7, 1915. Stenographic report of proceedings loaned by the secretary, Mr. Moorhead Wright.

plans and specifications of model cotton warehouses capable of construction at a cost of from $1.00 to $1.25 per bale capacity. I hope the Conference will appoint at this session a special committee on uniform warehouse laws, to the end that there may be adopted, as the ultimate outcome of this Conference, some uniform warehouse law and some uniform cotton warehouse receipt applicable to every southern state.

But probably the most important problem confronting the present Conference is the outlining of a vigorous campaign for the continuation of crop diversification in the South during the year 1916, and to this end I believe that every possible agency of the Southern States Bankers' Association should be brought to bear. As a result of an increase of seven million acres planted to feed and food, southern farmers have produced the 1915 cotton crop at the lowest cost in many years. It seems to me that prudent and conservative banking should dictate that, in so far as possible, southern bankers base their credits to southern farmers next year upon their self-supporting ability. I believe that each state association should, beginning immediately, conduct a campaign all over the South under the auspices of the bankers' agricultural committees acting in conjunction with the United States Department of Agriculture and the agricultural and mechanical colleges. For, while I believe that the average southern banker realizes that sufficient feed and food acreage, and the raising of the farmer's meat supply on the farm mean a greater prosperity and safer banking for the South, how many southern bankers will take the initiative, basing their loans upon this condition, and requiring of southern farmers the insurance policy of sufficient feed and food for self-support? Dr. Bradford Knapp suggests a farm credit rate sheet, in order to make sure of self-support, to be used by bankers and merchants in giving credit to farmers.

243. THE RATE-SHEET AS A MEANS OF STANDARDIZING CREDIT

Texas bankers who make a practice of loaning money to farmers have adopted, for their own protection and for the guidance of borrowers, what is known as a "crop rate sheet for safe farming and bank credit." Taking a 40-acre two-horse farm as a unit, this sheet states the live stock and the quantity of food and feed crops necessary to support on such a farm a family of five. The prospective borrower is requested to state in the same way the actual system followed on

his own farm. The closer the actual practice approaches the system outlined in the rate sheet, the better is the farmer's credit.

The bankers consider that the following arrangement is a safe basis, for borrowing and for loaning money:

FOOD CROPS

Four pigs for 1,000 pounds of pork.

Fifty laying hens or equivalent in other poultry.

Two cows, one in milk constantly.

One acre for constant supply of fresh vegetables and canning; cowpeas and other beans, to be grown in corn; area sweet potatoes, one-quarter acre; area for syrup, one-quarter acre sorghum or sugar cane; pumpkins and cushaws, to be planted in corn for good food and feed; one and one-half acre pasture. For winter pasture sow a grain between the cotton rows.

FEED CROPS

Acres corn with cowpeas, corn shocked, 240 bushels on 12 acres, at 20 bushels per acre; 48 bushels cowpeas, at four bushels per acre; corn stover, four tons; acres in hay crops, 12½ tons, five acres sorghum, Sudan or other hay; total acres food and feed, 20 acres.

COTTON, MONEY CROP

Acres in cotton, 20 acres; total acres in crops, 40 acres, two-horse farm.

For the purpose of the rate sheet, it is assumed that the yield of cotton will be one-third of a bale per acre, and of corn 20 bushels an acre. A farm managed in this way will yield, according to the bankers, an income of $664.78, with cotton at 8 cents a pound, and of $698.08, with cotton at 10 cents. On the other hand, the all-cotton farm, with the same prices for cotton, will have an income of only $460 or $560.

In drawing up these estimates, the labor factor is not considered, although the all-cotton farm probably requires more than the food and feed farm. Furthermore, the fact that 20 acres of cotton can be worked more carefully and a greater yield per acre secured than 40 acres, is not taken into account. It is probable, however, that when only 20 acres are planted to cotton, a yield of one-half a bale, instead of one-third could be secured. The food that the food-and-feed farmer grows for his own use is credited to him at the same price that the all-cotton farmer would have to pay for it. The objection that this food may be more than the farmer's family needs is answered by the fact that some of the products may be exchanged for flour, sugar,

etc., or that the excess quantity may be sold or converted into more live stock.

In sending out this rate sheet with the accompanying tables showing the incomes from the all-cotton and the cotton, food, and feed farms, the Texas Bankers' Association declares that the statement it is asking the farmers to make is a similar one to that required of all merchants seeking loans.

The system adopted as a basis for credit is not, of course, to be considered as inflexible, or as applicable to every section of the cotton states. It does, however, serve as a valuable guide for determining to what extent the farmer is conducting his business on sound principles. It is pointed out that no bank ever cares to foreclose on mortgages, and that it is most important, therefore, to have some means of judging of the borrower's ability to meet his obligations.

244. RESULTS ATTAINED UNDER THE FEDERAL RESERVE ACT[1]

The Board has given much attention to the adoption of appropriate measures intended to promote the ready movement of crops. All this has been done upon a basis furnished by the general work previously accomplished in defining commercial paper and in issuing standard regulations designed to describe the essential elements of the principal types. Very satisfactory results have been accomplished through these efforts. The crop-moving season has been unusually easy with exceptionally little strain or indication of stringency in any locality. The fact that commodity paper, that is, notes and bills secured by readily marketable staples, has been acquired in large amounts at rates from 3 to $3\frac{1}{2}$ per cent, and that long-time agricultural paper has, subject to the restrictions of the law, been freely taken by the reserve banks whenever offered, shows what the system can do for the agricultural short-time borrower.

In order to be prepared for any contingency that might arise in connection with the marketing of the cotton crop, the Board, in June, 1915, appointed a special committee to study the condition and needs of the cotton-growing districts. The committee, realizing the importance of fostering a financial condition in which producers would not be obliged to sacrifice their cotton, but would be assisted in the gradual and orderly marketing of the crop, began its work by investigating

[1] Adapted from *Second Annual Report of the Federal Reserve Board*, pp. 3–9, 70, 324.

warehouse facilities in the cotton belt and by making a careful study of the laws governing warehousing in the southern states. It was not long in reaching the conclusion that the yield of cotton would be much less than was the case in 1914. Finding the storage facilities for such portion of the crop as might have to be carried over generally adequate, it recommended the creation of a special kind of accommodation to assist those producers who, having made their crop, might desire temporarily to withhold a portion of it from market. The committee entertained the view that warehouse receipts for cotton, grain, and other staple, non-perishable agricultural products of a readily marketable character, form an excellent basis for bank loans, particularly as under the terms of the Federal Reserve Act and the regulations of the Board, notes thus secured are eligible for rediscount by Federal Reserve Banks.

During the summer, the committee developed a method by which producers could secure low rates upon loans secured in this manner, and in order to encourage co-operation between member banks and producers, the Board issued on September 3, 1915, its commodity paper regulation which provided that notes secured by non-perishable staple commodities, having a specified date of maturity, and upon which member banks had not charged a rate of interest, or discount, including all commissions, of more than 6 per cent per annum, should be eligible for rediscount in Federal Reserve Banks at a preferential rate. It should be especially noticed that this commodity rate, so called, was not confined to any section of the country or to loans secured by any one commodity, but was general in its nature. It applied not to cotton alone, but to other staple products, such as grain, sugar, and wool. It was, in fact, adopted by several of the reserve banks, some of them, however, receiving but little business under it owing to the abundance of funds in member banks.

The Board, moreover, in the exercise of the powers conferred upon it by the Federal Reserve Act, was fully prepared to set in operation, if it should become necessary, at rates to be fixed by it, the machinery of interbank rediscounting, in order to make available for Federal Reserve Banks requiring larger resources the available funds of other reserve banks, the collective strength of the reserve system as a whole being far in excess of any demands that might reasonably be expected to be brought to bear upon it at that time.

The Board's commodity paper regulation was issued September 3, 1915, well before the time when the movement of the cotton crop

could be expected to give rise to drafts upon the southern banks, and it was some time, therefore, before any considerable number of applications for loans at the commodity rate was made. During the month of November the southern reserve banks converted many of their loans into the commodity form. Such loans aggregated $10,300,000 to the end of the year, $7,500,000 being the volume outstanding on December 30, 1915.

The effect of the commodity paper regulation was mainly anticipatory and protective. The certain assurance that whatever funds might be necessary for the gradual and orderly marketing of the cotton crop would be available at moderate rates had an immediate and stimulating effect on sentiment. Other factors which contributed to the same result were the evidences of an early and active buying movement and the realization that the cotton yield would be much less than that of 1914. Within 60 days, prices advanced from 8 cents to 12 cents per pound. There was a steady movement of the staple to primary markets, the price of cotton seed advanced to a figure that added from $20 to $25 a bale to the farmer's income, and comparatively little cotton had to be carried by banks for producers.

The fact that there has been no demand for inter-bank rediscounts, and that the autumn season has passed without the usual stringency due to the necessities of crop moving, point conclusively to the benefits derived from the Federal Reserve System. It is quite true, as has often been observed, that the great release of reserves under the Federal Reserve Act produced an unusual ease of money the country over. This general ease, however, would not of itself have solved the difficulty of crop moving, or have met the regularly recurring currency requirements of the various agricultural sections of the country.

AMOUNTS OF COMMODITY PAPER DISCOUNTED BY EACH OF THE FEDERAL RESERVE BANKS FROM SEPTEMBER 8, DATE OF FIRST DISCOUNT, TO DECEMBER 31, 1915

[In thousands of dollars]

Federal Reserve Bank	Commodity Paper Discounted during Month of				
	September	October	November	December	Total
Richmond	96.0	364.4	1,523.4	897.6	2,881.4
Atlanta (including New Orleans branch)	807.3	1,657.2	2,739.1	1,828.7	7,032.3
St. Louis		31.2	15.0	53.6	99.8
Minneapolis		1.5	12.5	11.3	25.3
Dallas	2.3	4.8	83.7	148.2	239.0
San Francisco*		35.7	1.5		37.2
Total	905.6	2,094.8	4,375.2	2,939.4	10,315.0

* All discounted at regular rates.

245. THE COMMODITY REGULATION OF THE FEDERAL RESERVE BOARD[1]

By W. P. G. HARDING

Now, we all know that the farmer has temperamental peculiarities. We know, as a matter of fact, that the farmer has been accustomed in the fall of the year when his crop is made, either to dump it on the market voluntarily, or to have someone say to him that he must dump it to get the cash and pay his debts. We feel in Washington that it would be a great thing if the farmer could feel that there were special inducements offered him to do his part in this gradual marketing movement. We thought of that when the Federal Reserve Board framed its commodity regulation. Now, we have talked with a number of bankers from the South and we realize that they cannot loan money at 6 per cent as a general proposition. But we felt that an unusual occasion was presented to us, that here was a crop that had been produced and was ready for market and that the price was not as high as we thought it should be on its merits. We desired to put the southern bankers in a position where they could go to the southern farmer and say, "If you have your crop properly warehoused, we want to loan you some money on this cotton so that you can pay your pressing debts and enable you to hold it until you can get such a price as we think is fair and equitable." Now the southern farmer, as a rule, would be reluctant to hold his cotton if he had to pay 10 or 12 or 15 per cent interest to carry his cotton. Mark you, the crop has already been made; there is no risk attached to it—properly warehoused. The whole country is full of money: the bank reserves are greater than at any time in the history of the nation: no bank of any consequence, national or state, but is anxious to make loans. The federal reserve banks' resources are scarcely touched. So they issued the regulation to the effect that any bank who loans on warehouse receipts on cotton properly insured, at a rate of interest, including commission, not exceeding 6 per cent, should have the privilege of rediscounting with the federal reserve bank at a 3 per cent rate. There was no compulsion about that. Any bank which did not care to make that loan could demand the same loan under the commercial regulations at the rate of 4 per cent.

[1] From address at the Conference of Cotton States Bankers, New Orleans, December 6–7, 1915. Stenographic report of proceedings loaned by the secretary, Mr. Moorhead Wright.

But to get the benefit of the abnormal rate of 3 per cent, it had to certify that it had made this loan at a rate not exceeding 6 per cent. It gave the bankers an opportunity to co-operate in this movement by offering special inducements to the farmer to carry his cotton at 6 per cent. This was the force of the commodity regulation.

NOTE.—The text of the commodity regulation is as follows.—EDITOR.

Circular No. 17
Series of 1915

FEDERAL RESERVE BOARD

WASHINGTON, September 3, 1915

COMMODITY PAPER

In Regulation B, series of 1915, the Board has established the policy of encouraging transactions of Federal Reserve Banks in trade acceptances and in commodity paper by admitting these kinds of paper to be rediscounted by Federal Reserve Banks with the waiver of the particular requirements with reference to statements.

In pursuance of this policy, the Board has issued a regulation (P, series of 1915) laying down the conditions under which trade acceptances may be discounted by Federal Reserve Banks at a special rate to be published for this kind of paper. In further pursuance of the same policy, the Board in the appended regulation (Q, series of 1915) has authorized special rates on commodity paper.

It is expected that this new class of paper with its special rates will prove of particular efficacy in meeting the seasonal demands for credit facilities in the crop-producing districts, and the Board in authorizing these special rates will rely on the Federal Reserve Banks to adopt a policy which will result in securing for the ultimate borrowers the extension of credit on moderate terms by member banks. As in the case of trade acceptances, the rates to be established for commodity paper may be expected to be lower than the rates established for ordinary commercial paper. It will be left to the discretion of the Federal Reserve Banks to determine whether different rates should be established for trade acceptances and commodity paper. Uniformity of rate may appear to be desirable in districts where there are transactions in both kinds of paper.

CHARLES S. HAMLIN, *Governor*

H. PARKER WILLIS, *Secretary*

FEDERAL RESERVE BOARD

Regulation Q
Series of 1915

WASHINGTON, September 3, 1915

COMMODITY PAPER

In this regulation the term "commodity paper" is defined as a note, draft, or bill of exchange secured by warehouse terminal receipts, or shipping documents covering approved and readily marketable, nonperishable staples properly insured.

Commodity paper, to be eligible for discount by a Federal Reserve Bank under section 13, at the special rates hereby authorized to be established for commodity paper below the usual commercial rates, must (a) comply with all the requirements of Regulation B, series of 1915, paragraphs I and II, or with the requirements of Regulation C, series of 1915; (b) and be paper on which the rate of interest or discount, including commission charged the maker, does not exceed 6 per cent per annum, and also (c) comply with such regulations as may be issued by Federal Reserve Banks covering requirements as to warehouse or terminal receipts, shipping documents, insurance, etc., adapted to the particular needs of its district as a condition of the special rate herein authorized.

Federal Reserve Banks are now authorized to submit rates for the discount of commodity paper in accord with this regulation for review by the Board.

CHARLES S. HAMLIN, *Governor*

H. PARKER WILLIS, *Secretary.*

D. Criticism and Proposals for Reform

246. THE AGRICULTURAL CREDIT SYSTEM OF GERMANY[1]

BY LE ROY HODGES

Rural banks were first established in Germany by Raiffeisen in 1862, and on June 1, 1910, less than fifty years later, there were 15,517 legally established institutions in the empire.

The members of the Raiffeisen banks are farmers, usually peasant proprietors. The number of members per bank varies considerably, although, taking the banks under the National Federation as a whole, 92 members per bank is a fair average. Under the constitution of the banks a minimum membership of seven is required. Some of the recently organized banks have exactly this number of members. The highest number of members reported for any one bank is 1,400, which is a very exceptional case.

[1] Adapted from House Document No. 1435, 62d Cong., 3d sess., pp. 10–34.

Raiffeisen established his banks on the fundamental principle of unlimited joint and several liability of the members. Unlimited liability is still regarded in Germany as the system best adapted to rural co-operative credit, while for other forms of rural co-operation limited liability is being more generally adopted.

In order to avoid any danger of capitalistic speculation, Raiffeisen excluded shares altogether from his banks, but in 1876 he was obliged to comply with the imperial law which compelled co-operative societies to have foundation capital, and fixed the shares at a maximum value of 10 marks (about $2.40). The Darmstadt federation, on the other hand, recommended comparatively large shares, but not to exceed 500 marks (about $120). In very few cases, however, does the value of the share exceed 100 marks (about $24).

In societies where the liability is unlimited a member cannot take more than one share; in societies with limited liability, however, he may take more. The value of the shares, and, in the latter case, also their number, are fixed by the rules. The shares are repayable to the members upon withdrawal from the society, and interest is paid upon them at a rate which must not in any case exceed the interest which borrowers pay upon loans from the society.

The pure Raiffeisen system does not admit of entrance fees, although the Darmstadt federation allows small fees which are carried immediately to the reserve fund. Another fundamental principle of the Raiffeisen system is that the area of operations is limited to a commune or a parish. The organization of the rural banks being, therefore, familiar and friendly, so to speak, their management is very simple. The administrative functions are divided between the committee of management, the council of supervision, and the general meeting. The executive work is carried out by the treasurer, who is often the only employee of the bank, and in any case is responsible for the work of the other employees.

The general meeting appoints the committee of management, the council of supervision, and the treasurer. The conduct of the business is intrusted to the committee of management, upon which often sit the best educated persons of the district, such as the schoolmasters or priests; for these, however, farmers are being more and more substituted.

The committee of management usually give their services gratuitously. This, too, is one of the principles of pure Raiffeisenism, which, however, permits in any case the remuneration of the treasurer

The Darmstadt federation allows the committeemen to be paid for their services when the business of the bank is fairly large.

In 1909, for instance, the expenses of management amounted, on an average, to the modest sum of 638 marks (about $153.12) per bank.

The capital which the rural banks have at their disposal for making loans to members is composed of the shares paid up by the members, the reserve fund accumulated in previous years, the savings deposits, and deposits on current account, and the sums which they procure by means of loans from the central co-operative banks, other banks, or private individuals. Current accounts and savings deposits furnish 85 per cent of the total working capital, while about 11 per cent is drawn from the outside sources, such as the central co-operative banks, other banking institutions, and the general public.

Savings deposits may be made either by members or by non-members, but deposits on current account can only be made by members.

Making advances to members is the principal business of the rural banks. Surplus money is deposited with the central banks or invested in banking operations with third parties. Loans consist of two kinds: first, loans on current account; and second, loans for fixed periods. The loans on current account compose about a third of the total loans of the German rural banks, and there is a tendency to extend the practice.

The members guarantee the fulfilment of their obligations to the bank by finding sureties, by the deposit of valuables—such as share certificates, etc.—by giving a mortgage, or by their mere promise. The finding of sureties is the form of security usually preferred. The period of loans varies from six months to two years or three years, and even more in exceptional cases.

The principal safeguard for the success of the rural banks lies in their very constitution. The limited area of operations and the nature of rural life make it possible for each member to keep an eye upon the affairs of his fellow-members in which, moreover, he is directly interested, so that he can easily judge at any moment of their solvency and of the manner in which they are utilizing the money obtained from the bank.

The object of the rural banks is to give credit to the members on favorable terms and not to make a commercial profit. The Raiffeisen system, accordingly, does not admit of any distribution of dividend, all the profits realized being carried to the reserve fund or to the creation of institutions of public utility. The Darmstadt federation,

on the other hand, allows a distribution of dividend on the shares, which, however, must not exceed the maximum rate of interest charged to borrowers.

In 1909 the net profit realized by the rural banks was more than 7,000,000 marks. This is sufficient evidence of the flourishing condition of these institutions. Of this enormous profit only a small fraction was distributed as dividend. In this manner the banks are continually strengthening their financial position. This is demonstrated by the steady increase of the reserve funds. In a single year, from 1908 to 1909, the aggregate reserve fund was increased by 7,000,000 marks, while the profits realized at the end of 1908 were about 8,000,000 marks. Thus seven-eighths of the profits made in that year were carried to the reserve.

Agricultural credit is furnished in Germany by the Schulze-Delitzsch co-operative banks, usually spoken of as the "popular" or "urban" banks, as well as by the purely rural banks under the Raiffeisen system. Notwithstanding the great development of the rural banks, many farmers still utilize the Schulze-Delitzsch banks. In fact, about 28 per cent of the membership of these banks is composed of farmers and farm laborers.

The Schulze-Delitzsch banks have, therefore, unlike the rural banks, a large range of business in an extended area of operations; they accumulate a considerable quantity of capital and they distribute fairly high dividends. They do not follow the principle of unpaid management; on the contrary, their management is rather costly and is conducted on strict business lines. They are very often based on limited liability, and they carry on a series of banking operations which the rural banks seldom undertake. Their business is modeled, more closely than the rural banks, upon the plan of banks doing a purely commercial banking business.

In addition to the co-operative banks under the Raiffeisen and Schulze-Delitzsch systems, Germany has another very characteristic form of co-operative credit, commonly spoken of as the landschaften, usually organized for a whole Province. There are about 25 institutions now existing under this system, principally in Prussia. Their object is to obtain for their members the credit required for land improvements by means of bonds guaranteed by the landowners of the province collectively. The landschaften societies furnished German agriculture in 1909 with more than $840,000,000 of loans on mortgages at rates of interest not exceeding 4 per cent.

The constitutions of the landschaften vary considerably from each other, being adapted to the special needs of their respective provinces. All, however, have a committee of management and a general assembly of landowners. Members of the committee of management having legal training, the syndics, as they are called, receive pay. The other members of this committee and of the general assembly are landowners, who receive only their traveling and incidental expenses.

The total number of landlords of a district collectively grant a loan to the proprietor applying for it. The purpose to which the loan is to be applied must be stated in detail in the application. No proprietor can be refused a loan, as his land serves as security to the landschaft.

Loans are not granted exceeding a certain percentage of the value of the lands, varying with the different provinces and according to the methods employed in fixing the rate of interest. The body of landlords, although they possess real estate of enormous value, seldom have cash money at their disposal and are forced to get from third parties the money needed for loans to the borrowing landowners. They have recourse indirectly to the capitalist as a means of getting this money, offering their lands as a medium of investment.

In order to render the negotiation of this paper easier for the lenders, special banks have been instituted in connection with the landschaften dealing with this business, under the control of the society itself and without any intention of making a profit. The profits go to the landschaft as such. Formerly it was mortgaged land that served as security under a secondary security of the landschaft. Today the capitalist who has bought the bonds and is the creditor of the borrowing landowner has nothing to do with him. He receives his interest from the landschaft and the whole of the estate of the province forms his security.

At first most of the landschaften only gave mortgages for one-half of the estimated value. Now they generally go as far as to give them for two-thirds of the value. Land already burdened with other mortgages cannot receive any loan from the society. The landschaften, however, help proprietors when, in order to obtain a loan, they desire to pay off previous mortgages.

Except in the case of the three institutions of Hanover, the loans are not granted in money, but in bonds.

The interest the debtor must pay the landschaft is generally from one-half to 1 per cent higher than what the landschaft itself pays its creditors.

The difference serves to cover the expenses of administration, to constitute special funds created in the interest of all the members of the society, as well as for the creation of reserve funds and for the gradual extinction of the debt. The landschaft generally renounces its right of calling up the money it lends, but the debtor can always repay the money borrowed. Generally this repayment takes place by gradual extinction, which is often even obligatory for a certain proportion of the debt. The sums so repaid must be considered at the same time as reserves in case of possible losses to be incurred.

The public readily accepts the bonds of the landschaften, although the rate of interest is often as low as $3\frac{1}{2}$ per cent. The bonds have also always been well received on the national market, and in order to open an international market for them certain landschaften in 1873, with the permission of the government, founded a central landschaft for the Prussian provinces with headquarters at Berlin. The landschaften that now form part of this union are allowed to issue provincial bonds and also bonds of the central landschaft. In issuing these last, however, they are bound to observe certain rules as to the methods of valuing the lands.

The bonds of the central landschaft are well received on the exchanges, where they have almost the same standing as the Imperial and Prussian bonds.

247. CAN CO-OPERATION REMEDY RURAL CREDIT CONDITIONS?[1]

By LEWIS H. HANEY

When we come to examine the chances for successful personal credit associations in Texas, it seems that the negro population must be left out of consideration for the present. In most parts of the state the negro would be excluded from organizations of whites, and it is more than doubtful if negro credit associations could succeed. Also, a part of the poor white farmers are beyond the reach of co-operation on account of their migratory habits and thriftlessness. It is the writer's well-considered opinion that fully 10 per cent of the white tenant farmers of Texas are hopeless—cannot get good credit by any means.

Some of the adverse conditions affecting the majority of the whites are as follows: (1) There is a large element classed as "poor whites," a shifting and shiftless group; 5 per cent of the native white

[1] Adapted from the *American Economic Review*, IV, No. 1 (March, 1914), 61–66.

males in the rural population are illiterate, and 31 per cent of the foreign-born white males; while only 44 per cent of the native white rural children are attending school. (2) These people are largely short-time tenants. (3) The one-year lease is almost universal, and under it tenants commonly are migratory and take no interest in scientific farming. So shifting a population is seriously handicapped in developing that mutual acquaintance and trust which may come in more stable groups. (4) It follows that farmers are deficient in disposition and training for team work and do not easily pull together as co-operation requires. (5) Finally, a speculative spirit pervades even farming operations and is opposed to the spirit of frugal saving which must attend the successful operation of credit unions.

Many native Texans are not efficient farmers, a fact which is clearly demonstrated by comparison with German and Bohemian farmers who occupy certain sections of the state. The foreigners get a far larger return per acre, while at the same time maintaining the fertility of their land. As a result, they find no difficulty in getting credit when they need it, though, as a matter of fact, they borrow far less frequently than the native farmers. There can be no question that the introduction of better farming methods is much needed as a basis for better farm credit.

The strongest argument in favor of personal credit co-operation, however, is probably the educative value of co-operation itself. Efforts in co-operation increase the facility of co-operating. The object of successful credit organization must be to improve such non-transferable productive powers as poor men can possess—strength, skill, energy, and honesty—and to organize and direct them so that they may be used as a basis of credit; and to this basis it may add by making more readily negotiable the small property possessed which is not now accepted as security on favorable terms. Of course, there must be a modicum of the qualities just mentioned to start with.

Stated comprehensively, what co-operation can accomplish in states like Texas is as follows: First, it can reduce the risks of lending in at least six ways. (1) The integrity of the co-operative group can be raised above the average of the class concerned by a selective process. To this end, the area embraced in a single group should be limited, and good standing among neighbors and acquaintances be made a condition of membership. (2) The interests of the immediate borrowers and lenders are harmonized. This is accomplished through the fact that the capital of the co-operative unit is largely drawn from

the entrance fees and deposits of farmer members. (3) The credit of individual members is pooled, thereby increasing the borrowing power of each. The pooling is the result of a collective guaranty of loans made to any member, and its effectiveness increases with the extent to which the collective guaranty increases, being at a maximum under unlimited liability. (4) The security of loans can be increased by careful and intelligent scrutiny of the purposes of the borrower in order to insure against loans for unproductive purposes. And, of course, this feature can be strengthened by inspection to see that sums borrowed are applied for the purpose specified. (5) By means of local supervision the most productive methods of applying loans can be secured and more skilful farming be encouraged. (6) Finally, the security that farmers have to give can be made more liquid and negotiable. To be concrete, land and cotton are not welcomed by our commercial banks as bases of credit; but by co-operating and pooling such resources and making them the basis of issues of equal, transferable securities of convenient denomination, a ready loan market may be created. Clearly, points 1, 2, and 3 insure improvements in *integrity*, or will to pay; and points 3, 4, 5, and 6 insure greater *solvency*, or ability to pay. These are the very bases of credit.

In addition to the preceding means of reducing risk, it is to be remembered that economy in direction and management of the credit business can be gained by co-operation. By confining operations rigidly to securing credit, and working through small local units, the simplest and cheapest organization is secured. A single central organization can serve as a clearing house for a large area.

The greatest need is working capital with which to make crops, with a less immediately urgent need of farm animals. This need exists more urgently among a large mass of poor tenant farmers. Therefore, the most desirable credit agency is one which can best supplement existing agencies in developing such credit as these farmers have. These facts indicate an organization of the personal credit type, confined to as small areas as is practicable, and operating with a liability that is greater than that of corporation stockholders. The object of co-operative credit is not so much to increase directly the money security as to improve integrity and, indirectly, income and ability to pay.

Recognition of the local situation, however, would seem to indicate some modification of the personal credit idea in making loans to members, temporarily, at least. The chattel and crop mortgage system

is well developed and thoroughly understood, and the existing banking machinery is adjusted to it. It does not lock the money up for too long a time, as is the case with land; and the security if seized is more readily salable. Close local supervision by interested fellow members would insure the best care for cattle, crops, etc. A use of the chattel mortgage would facilitate the securing of funds from commercial banks. Say there are twenty-five members, each of whom borrows $300; their aggregate notes secured by chattel mortgage amount to $7,500. Instead of going to the storekeeper, who now acts as credit middleman between bank and farms (at a rate of over 20 per cent), these twenty-five farmers give their notes to their credit unions, which deal with the bank for them. With unlimited liability, which we are supposing, it is likely that a bank would lend the association the full $7,500 at the lowest commercial rate of interest—and angels could do no more. Even if limited liability prevailed, the association would merely make its note for enough less than $7,500 of mortgages to allow a safe margin, and so, by risking $7,500 for, say $6,000, the lowest rates might be secured.

Such utilization of chattel mortgage security would make it possible to gain the most from existing banking agencies, which is highly desirable. The country banks of Texas at present extend a wide range of service to farmers and desire their business. The best attitude to take toward co-operative associations is to regard them as feeders for commercial banks. The great source of funds is the same under any credit system. *What co-operative organization should seek is to become an effective credit middleman between latent or ill-used bases of credit among farmers and the funds held in commercial banks.* To replace the storekeeper in the existing system would be a large part of its service.

248. THE GOVERNMENT MUST GIVE DIRECT ASSISTANCE[1]

By SAMUEL M. TAYLOR

Aid to enable farmers to procure money to purchase homes and to carry on agricultural pursuits has been extended by every enlightened government save our own. We have extended governmental aid in one form or another to every line of business except agriculture. Millions of acres of public lands were given away to corporations to

[1] Adapted from extension of remarks in the *Congressional Record*, 64th Cong., 1st sess., pp. 3468–69 (February 23, 1916).

induce them to build railroads. In the past this government has subsidized shipping lines to carry mail; guaranteed the contract of the bankers in order to enable them to realize on their paper; we have agents in every part of the world developing business for our merchants and manufacturers, but we have left our farmers to the tender mercies of great mortgage and loan companies, who charge ruinous interest rates. We have disregarded the fact that the cost of production necessarily must enter into the cost of the product to the consumer, and therefore have contended that any aid extended to the farmer was class legislation. Yet we must realize with emphasis that everything that is eaten and worn must be the product of his toil, and its cost to the consumer necessarily influenced by the cost of production. This being granted, direct federal aid to the farmer will be as helpful to all other classes as to him, because to the consumer the cost of living would be cheapened and all classes would benefit by the legislation equally, and there would be, therefore, no class legislation. However, the sharp line of division between those who really want to enact helpful legislation that is really helpful to corporations and groups of men of great wealth and hurtful to the farmer divide upon this one question of government aid. With it the farmer will be emancipated. Without it he will have to begin over again his fight for justice.

If legislation is enacted at this Congress, as proposed by some, without any aid being extended by the government, the farmer will reject it. He will realize it was not intended to help him, but merely to silence him; that instead of lifting his burdens, it will grant a respite to those who are oppressing him. It will postpone the day of justice, because, when he complains, he will be answered that "we have legislated in your behalf, and you have not as yet had time to determine whether it will be helpful or not and you must wait."

It is strange that the idea is advanced always that the government must not come to the relief of one class when the farmer is being considered, yet all other classes are embraced in legislation directly intended to benefit that class. No one objected to government aid as applied to commerce and manufacturing enterprises. No one protested when appropriations were made to search out markets. No one now seriously questions the wisdom of purchasing ships to transport commercial commodities to markets where they may be profitably disposed of. No one seriously objects when millions of dollars are expended to deepen harbors as places of refuge that

commerce might be safely and cheaply handled; but the instant that legislation is proposed that will unshackle the farmers and make it possible for the tenants to become owners of farms, we are met with a protest that the proposed legislation is class legislation, is unconstitutional, and is contrary to the genius of our government. I take it that not for long will this great and deserving class of citizens submit to this unjust and unpartriotic treatment at the hands of its legislative body. The farmer demands less at the hands of his government and receives infinitely less than any other class of citizens. His occupation in a measure isolates him. It teaches him to rely upon his own resources; to meet and solve his own difficulties; to fight his own battles, and to do that single handed and alone. Therefore, he has never banded himself together, as other classes in this Republic have, and beseeched in one voice in the halls of legislation that justice might be done, and accordingly he has received nothing but faint praise and much exploitation.

In the Sixty-third Congress there was an opportunity to have lifted from the farmers the burden they should not have borne in the way of exorbitant interest rates. I supported this bill, but the efforts of those who should have been the friends of the farmers were frittered away in support of measures, some of which were good and some wholly vicious, and each man wedded to his own idol, while those opposed to legislation by lining up first with one group and then the other to fight all measures defeated all measures. Whether the same methods are to be pursued in this Congress is not yet apparent. There are measures pending in Congress, some of those the same bills that were introduced in the Sixty-third Congress, that if enacted into law, or the principles engrafted upon the committee bill, would procure for the farmer the full measure of relief that he is entitled to receive, and we who are his friends in Congress are pledged that no legislation not bearing these provisions shall be enacted into law by a vote of ours nor shall they be enacted into law without our protest.

The present Congress and our great President are about to redeem the promise made at Baltimore in the new declaration of human rights. Under the provisions of the present committee bill as it is being redrafted, and amendments added thereto, farmers will be enabled to borrow money on a long-time repayment plan at a rate of interest not in excess of 6 per cent, and possibly not greater than 5 per cent. There are many provisions in this bill that my judgment does not approve; however, in the main it stands for those things for which

the friends of rural credits have contended, and I stand with them. It commits the government in a measure to aid this system. When we have enacted it into law, and I believe we will, great relief will come to the farmer—no such sufficient relief, however, as in my judgment he is entitled to receive, but the best that can be had under existing circumstances. In fighting for this measure, as I shall do, and in advocating its passage, as I will do, I do not mean thereby to say that the farmers have received under this bill all they are entitled to receive at the hands of this government. I do not mean thereby to say that I shall accept it as a just and adequate relief. On the other hand, I intend that this shall be merely a stepping stone, a beginning, a new starting point, in the fight that we are now waging to give justice to this most deserving class of our citizenry.

249. STATE AID UNNECESSARY[1]

By MYRON T. HERRICK

Unfortunately the rural credits movement has been rived by a serious cleavage, and on one side stand those who insist upon state aid, and on the opposite side stand those who believe in private initiative and co-operation. The demand for state aid in farm mortgaging is very strong, and the tendency in that direction was exceedingly pronounced in the last Congress. Practically all the measures introduced provided for it to a greater or less extent, while those that received the most attention proposed its use for farmers generally to a degree that appears in Europe only for the lowest class of peasants. About one-half billion dollars was demanded for cotton-growers, while cheap money without limit through government intervention was demanded for farm mortgaging. The advocates of state aid cite as their arguments this use of state aid in some European countries, the critical situation arising from the Great War, and the indifferent or alleged antagonistic attitude of financiers toward farmers. On the other hand, the friends of private initiative and co-operation assert that conditions in Europe and the United States are dissimilar and that there is no emergency here calling for the use of government cash or credit. They cite as their arguments the official declarations of President Wilson, Secretary Houston, the United States and American commissions, and other experts against state aid, and they

[1] Adapted from an address delivered at the Panama-Pacific International Exposition, San Francisco, September 21, 1915.

contend that if proper legislation were enacted and rural co-operative organization perfected, the credit of landowners and the resources of farmers would be so vitalized that abundant capital would be available on easy terms for the cultivation of the soil and the continual advancement of agriculture.

The strongest argument for state aid is the claim that there is a pressing, immediate necessity for it; if that claim is wrong, or if any necessity that exists should disappear, then the demands for state aid ought to cease with it. State aid—after saying the most that can be said for it—is merely an expedient to meet an exigency, the existence of which is as stoutly denied by some people as it is asserted by others. Furthermore, it is advocated without fully considering its effect on the taxpayers not intended to be directly benefited, and without a thought of testing and letting the ordinary means of farm finance have a chance to show their worth.

The arguments for state aid are based on premises, the correctness of which can be logically proved, of course, only by future trial. In my opinion there is not one advocate of it but believes in his heart that the injustices he condemns and the troubles he mentions would be remedied, if private enterprise could be efficiently regulated and rural co-operation intelligently practiced. So in studying the question, we must consider the possibility of making these latter methods effective. They are more effective in Europe than the much heralded state aid and are more generally used than it. They rest upon individual honesty and capability. No one in this hall will maintain the superiority of European over American people in these two qualities. Indeed, we all think that the comparison runs in our favor; so if we should say, in spite of the wonderful agricultural organizations developed through private enterprise and co-operation in Europe, that such development is impossible here, the assertion is tantamount to an admission of inferiority, or an absurdly illogical deduction that American financiers and farmers cannot do what lesser peoples in Europe have accomplished to a remarkable degree of success.

E. State and Federal Legislation

250. CREDIT UNIONS IN MASSACHUSETTS[1]

Under a law approved May 20, 1915, Massachusetts, which had already made some beginnings toward co-operative credit in the cities, undertook to give the system a wider field of usefulness in the

[1] Chap. 268, General Acts of 1915, Commonwealth of Massachusetts.

rural districts. Seven or more residents of the commonwealth are given the right to associate themselves together for such purposes. The character of the business is indicated by the following extracts from the law:

SECTION 5. A credit union may receive the savings of its members in payment for shares or on deposit; may lend to its members at reasonable rates, or invest, as hereinafter provided, the funds so accumulated; and may undertake such other activities relating to the purpose of the association, as its by-laws may authorize.

SEC. 7. No credit union shall receive deposits or payments on account of shares, or make any loans, until its by-laws have been approved in writing by the bank commissioner, nor shall any amendments to its by-laws become operative until they have so been approved.

SEC. 8. All property of a credit union, except real estate, and all capital stock in a credit union shall be exempt from state and local taxation, except legacy and succession taxes.

SEC. 9. The capital of a credit union shall be unlimited in amount. Shares of capital stock may be subscribed for and paid in such manner as the by-laws shall prescribe, except that the par value of shares shall not exceed ten dollars.

SEC. 10. Shares may be issued and deposits received in the name of a minor.

SEC. 11. The capital, deposits and surplus funds of a credit union shall be invested in loans to members with the approval of the credit committee as provided in section seventeen of this act, and any capital, deposits, or surplus funds in excess of the amount for which loans shall be approved by the credit committee may be deposited in savings banks or trust companies incorporated under the laws of this commonwealth, or in national banks located therein, or may be invested in the bonds of any other credit unions or any farmland bank incorporated under the laws of this commonwealth or in any securities which are at the time of their purchase legal investments for savings banks in this commonwealth, or, with the approval of the bank commissioner, may be deposited in other credit unions or may be invested in the shares of other credit unions or of farmland banks or co-operative banks incorporated under the laws of this commonwealth: *provided*, that the total amount invested in the shares of other credit unions, farmland banks or co-operative banks shall not exceed 30 per cent of the capital and surplus, and that not more than 20 per cent shall be invested in the shares of other credit unions, nor more than 20 per cent in farmland bank shares, nor more than 20 per cent in co-operative bank shares.

SEC. 13. (Annual and special meetings) No member shall be entitled to vote by proxy or to have more than one vote, and, after a credit union has been incorporated one year, no member thereof shall be entitled to vote until he has been a member for more than three months.

The members at each annual meeting shall fix the amount of the entrance fee for the ensuing year, which may be made proportional to the number of shares issued to a member, the maximum amount to be loaned any one member, and, upon recommendation of the board of directors, may declare dividends in accordance with the provisions of section twenty-two of this act.

SEC. 17. The credit committee shall hold meetings, of which due notice shall be given to its members, for the purpose of considering applications for loans, and no loan shall be made unless all members of the committee who are present when the application is considered, and at least two-thirds of all the members of the committee, approve the loan and are satisfied that it promises to benefit the borrower. All applications for loans shall be made in writing and shall state the purpose for which the loan is desired and the security offered.

SEC. 18. Loans upon the security of first mortgages upon farm lands shall in no case exceed in amount 50 per cent of the value of the property pledged as security, and shall be for the following purposes only: (*a*) the clearing, draining, or otherwise reclaiming and permanently improving agricultural lands; (*b*) the providing of facilities for irrigation; (*c*) the planting and early care of orchards; (*d*) the erection of silos, cold storage plants, greenhouses, and permanent farm buildings; (*e*) the purchase of farms and farm lands for personal occupation and management; (*f*) the discharge of existing farm mortgages; and, (*g*) subject to the approval of the bank commissioner, such other improvements of a permanent nature as, in the opinion of the directors, tend to develop agricultural resources. The mortgage deeds securing such loans shall contain a provision for immediate foreclosure if the money lent is applied in whole or in part to purposes not hereby authorized, or if, in the opinion of the directors, it is being spent unwisely or wastefully.

A credit union may, with the approval of the bank commissioner, by vote of its board of directors, issue, sell, and trade in its own collateral trust bonds, which shall be known and described as farmland bonds and shall be secured as hereinafter provided by the deposit of first mortgage notes on farm lands and the mortgages securing the same. In case of failure of a credit union to pay the interest upon its bonds or the principal when due, the bonds shall be an underlying lien on all its assets and the bank commissioner shall forthwith take possession of the assets and wind up the affairs of the corporation. Loans on the security of first mortgages on farm lands shall be made, and bonds of credit unions secured thereby shall be issued, in accordance with the provisions of chapter two hundred and thirty-one of the General Acts of the current year relating to farmland mortgages and farmland bonds, and any acts in amendment thereof or in addition thereto, so far as applicable.

SEC. 19. No member of the board of directors or of either the credit or supervisory committee shall receive any compensation for his services as a member of the said board or of such committee, nor shall any member of the credit or supervisory committee, directly or indirectly, borrow from the corporation or become surety for any loan or advance made by it.

No member of the board of directors shall, directly or indirectly, borrow from the corporation or become surety for any loan or advance made by it, unless such loan or advance shall have been approved at a meeting of the members of the credit union by a majority vote of those present, and the notice of such meeting shall have stated that the question of loans to directors would be considered at such meeting.

The officers elected by the board of directors may receive such compensation as the board shall authorize.

SEC. 20. Before the payment of an annual dividend in any year, there shall be set apart as a guaranty fund 20 per cent of the net income which has accumulated during the fiscal year, except as hereinafter provided. Said fund and the investments thereof shall belong to the corporation and shall be held to meet contingencies or losses in its business. All entrance fees shall be added at once to the guaranty fund. Upon recommendation of the board of directors, the members at any annual meeting may increase, and, whenever said fund equals or exceeds the amount of capital stock actually paid in, may decrease, the proportion of profits which is required by this section to be set apart as a guaranty fund: *provided*, that, if the corporation holds stock in other credit unions or in farmland banks, the percentage of profits to be set apart as a guaranty fund shall not be decreased until the amount of the fund equals or exceeds the amount of capital stock of the corporation actually paid in and in addition thereto the amount actually paid for the shares of stock in such credit unions and farmland banks.

SEC. 22. At the annual meeting, a dividend may be declared from income which has been actually collected during the fiscal year next preceding and which remains after the deduction of all expenses, losses, interest on deposits, and the amount required to be set apart as a guaranty fund, or such dividend may be declared in whole or in part from undivided earnings of preceding years, not to exceed 20 per cent thereof in any one year, provided such earnings are a part of the surplus of the corporation in excess of all requirements of the guaranty fund.

SEC. 23. Within twenty days after the last business day of October in each year, every credit union shall make to the bank commissioner a report in such form as he may prescribe, signed by the president, treasurer, and a majority of the supervisory committee, who shall certify and make oath that the report is correct according to their best knowledge and belief. Any credit union which neglects to make the said report within the time

herein prescribed shall forfeit to the commonwealth five dollars for each day during which such neglect continues.

SEC. 24. The board of directors shall expel from a credit union any member who has not carried out his engagements with the credit union, or who has been convicted of a criminal offense, or who neglects or refuses to comply with the provisions of this act or of the by-laws, or whose private life is a source of scandal, or who habitually neglects to pay his debts, or who shall become insolvent or bankrupt, or who shall have deceived the corporation or any committee thereof with regard to the use of borrowed money; but no member shall so be expelled until he has been informed in writing of the charges against him, and an opportunity has been given to him, after reasonable notice, to be heard thereon.

The amounts paid in on shares deposited by or members who have withdrawn or have been expelled shall be paid to them, in the order of withdrawal or expulsion, but only as funds therefor become available and after deducting any amounts due by such members to the credit union.

251. THE LENDING OF STATE FUNDS IN OKLAHOMA[1]

AN ACT to encourage and promote home ownership in Oklahoma; providing for the investment of certain designated funds; authorizing the sale of bonds against the securities taken, and the re-investment of the proceeds

Be It Enacted by the People of the State of Oklahoma:

SECTION 1. The Commissioners of the Land Office are hereby authorized and instructed to invest all monies now on hand or that may hereafter be received from the sale of lands commonly known as "State Educational Institution Lands" (same being section 13 or lands taken in lieu thereof), and the "New College Lands," in first mortgage on improved farm land in this State under such rules and regulations as may be provided by said Commissioners of the Land Office not in conflict with the following:

(*a*) Not to exceed Two Thousand ($2,000) Dollars shall be loaned to any one individual or family.

(*b*) All loans shall be secured by first mortgage on farm lands upon which the borrower resides, and holds as his homestead, and the cash value of which, disregarding all improvements, is at least double the amount of the loan.

(*c*) Notes shall be drawn to run for twenty-three and one-half years—payment of 4 per cent of the full face value of each note to be made semi-annually; at each payment, interest at the rate of 6

[1] Session Laws of Oklahoma, 1915.

per cent, per annum upon the unpaid balance of such note to be deducted from the amount paid and the remainder to be credited upon the principal of the loan.

(*d*) Loans from said fund, shall be made only for the following purposes:

First: To assist the borrower to pay for a home.

Second: To pay off an existing mortgage upon the home.

Third: To make permanent improvement upon the home farm; Provided, that if such investments as hereinbefore provided are not reasonably available, then such funds may be invested in other securities authorized by the constitution.

SEC. 2. For the purpose of supplying additional funds for the loans herein authorized to be made, the Commissioners of the Land Office are hereby authorized to sell, for not less than par and accrued interest, all or any portion of the notes and security therefor taken for the sale price, or unpaid portion thereof, of any of the land above referred to; such sale to be absolute and without recourse.

The said Commissioners are further authorized to issue and sell, at not less than par value, bonds drawing not to exceed 5 per cent per annum interest, payable semi-annually, and to pledge for the payment of the principal and interest on same the notes and security therefor, taken for the sale price, or unpaid portion thereof, of any of the lands above referred to; provided, the amount of the bonds so issued, sold, and outstanding shall not at any time exceed 75 per cent of the face value of the unpaid portion of the principal of such notes.

The said Commissioners are further authorized to issue and sell, at not less than par value, bonds drawing not to exceed 5 per cent per annum interest, payable semi-annually, and to pledge for the payment of same, principal and interest, all notes and mortgages taken for loans from said funds; provided, that the amount of the bonds so issued, sold, and outstanding, shall not at any time exceed 90 per cent of the face value of the unpaid portion of the principal of such notes.

SEC. 3. The bonds herein authorized to be issued, shall be designated as "Oklahoma Home Ownership Bonds," shall be in denominations of Twenty-five ($25.00) Dollars, One Hundred ($100.00) Dollars, Five Hundred ($500.00) Dollars, and One Thousand ($1,000.00) Dollars, and shall not be subject to ad valorem tax,

but the income from such bonds shall be taxable under the income tax law.

SEC. 4. Each series of the bonds so issued and sold, shall be made payable, 10 per cent in four years from the date of the issue, 10 per cent in eight years, 10 per cent in eleven years, 10 per cent in fourteen years, 10 per cent in sixteen years, 10 per cent in eighteen years, 10 per cent in twenty years, 15 per cent in twenty-two years, and 15 per cent in twenty-three and one-half years. Attached to each bond, shall be coupons, numbered consecutively, also bearing the number of the bond to which it is attached, for the payment of interest as herein provided.

SEC. 5. All payments upon the principal of any loan, shall be credited to the sinking fund for payment of bonds at maturity.

SEC. 6. Any bank or trust or insurance company, organized under the laws of this State, may invest in the bonds issued under the provisions of this act. The officer having charge of any sinking fund of this State or of any county, city, town, township, or school district thereof, may invest the sinking fund of the State or of such county, city, town, township, or school district in "Oklahoma Home Ownership Bonds," which mature prior to the due date of the bonded indebtedness for the payment of which such sinking fund is created. Said bonds shall be approved collateral as security for the deposit of any public funds or trust funds and for the investment of trust funds.

SEC. 7. Said bonds shall be signed by the Governor and by the President of the State Board of Agriculture, also by the State Auditor, with the seal of his office affixed, and each interest coupon attached thereto, shall bear the facsimile signature of the State Auditor. Said bonds shall be registered by the State Auditor. Said bonds shall be registered by the State Treasurer with appropriate endorsement thereon, showing such registration.

SEC. 8. All "Oklahoma Home Ownership Bonds," issued as provided by this Act, together with the interest thereon, shall be paid in the order in which they fall due. Should the Commissioners of the Land Office fail to pay any bond (or coupon) issued pursuant to this Act, upon presentation of the same, at or after date of maturity, the holder thereof may, by mandamus, compel payment of same; Provided, that nothing in this Act, shall be construed so as to in any manner hold the State of Oklahoma liable for the payment of such

bonds, but they shall be paid from the proceeds of the loans herein authorized to be made.

SEC. 9. Any premium upon bonds sold, and the difference between interest paid upon the bonds and the interest collected upon loans, shall be paid into the State Treasury and kept in a special fund to be known as the "Maintenance Fund" from which shall be paid all expenses of loaning this fund and the sale of the bonds.

SEC. 10. The Commissioners of the Land Office shall have power to provide all necessary rules for the investment of this fund, not inconsistent herewith, and to employ such assistance as may be necessary and to fix the compensation of the same, requiring each employee to file an approved bond equal to the maximum amount of such fund that may be in his possession or subject to his order at any time.

SEC. 11. It shall be the duty of the State Examiner and Inspector to make a thorough examination of said fund annually, and to furnish a copy of his report to each holder of any "Oklahoma Home Ownership Bonds," whose name and address he may reasonably secure, and he shall file a copy of same with the Governor.

Passed January 28, 1915.

NOTE.—The act of January 28 was amended on March 22. Besides minor changes which I have incorporated in the version of the act printed above, the following provision was added.—EDITOR.

SEC. 3. For the purpose of paying all expenses of loaning the funds provided in Sections 1 and 2 of said Act, and of the preparation and sale of the "Oklahoma Home Ownership Bonds," there is hereby appropriated out of any money in the general fund of the treasury of the State, not otherwise appropriated, for the fiscal year ending June 30, 1916, the sum of Ten Thousand ($10,000.00) Dollars, or so much of said sum as may be necessary for said purpose; provided, however, that the general fund of the treasury of the State shall be reimbursed from time to time by the Commissioners of the Land Office in any amount available from the "maintenance fund" created by Section 9 of said Act, until the full amount expended under this appropriation is repaid.

Passed March 22, 1915.

252. THE MISSOURI LAND BANK[1]

AN ACT to secure a system to mobilize and liquidize farm credits, securing to the agricultural classes money on long-time credits and at low rates of interest so as to amortize the debt by small periodical payments, for which purpose a fund is provided and a corporation created to utilize state machinery and be governed by a board of high state officers authorized to make loans on farms secured by deeds of trust and issue debenture bonds against the same, exempting such securities from taxes and making them acceptable for certain investments, thus increasing the revenue by bringing foreign capital into the state

Be it enacted by the General Assembly of the State of Missouri as follows:

SECTION 1. For the purpose of fostering and encouraging agriculture in the state of Missouri, and of aiding in the development and improvement of farm lands, there is hereby created a body corporate and politic under the name of the Missouri Land Bank.

SEC. 2. The design and purpose of this act is to provide the means and instrumentalities whereby loans may be made to tillers of the soil at the least practicable cost to them, to be repaid in such manner and at such times as will be least burdensome, and at the same time provide suitable guaranties against loss.

SEC. 3. The said bank shall be under the direction and supervision of a board of governors, composed of the governor, attorney-general, secretary of state, state treasurer, and state auditor, who shall have the power to adopt rules and regulations for the government of the bank and the transaction of its business which shall not be inconsistent with this act, nor in conflict with the constitution and laws of the state. Among other things they shall adopt forms of notes and deeds of trust and debenture bonds.

SEC. 4. The said bank shall be located at the seat of government and annexed to the office of the state bank commissioner, who shall be the manager thereof, and the clerks and employes in his office shall perform all the services necessary in the transaction of such of its business as needs to be transacted in the office or counting room. All additional clerks and servants necessary shall be paid for out of the bank's funds.

SEC. 5. The bank shall have power to make loans to farmers, evidenced by promissory notes secured by deeds of trust in the nature of mortgage on farm lands, of amounts not in excess of fifty (50) per

[1] Laws of Missouri, 1915, pp. 196–201.

cent of the appraised value of the land pledged to run for periods of not less than five (5) years nor more than twenty-five (25) years, and no loan shall be for a less sum than two hundred and fifty ($250.00) dollars, nor for a greater sum than ten thousand ($10,000.00) dollars; and inasmuch as it is the policy of this act to improve and develop the largest possible number of farms and make them productive, the board shall so order and adjust its business as to give preference to those seeking loans of amounts less than five thousand ($5,000.00) dollars. The board shall so provide that loans shall be made only to applicants who offer first liens on perfect fee simple titles, free from courtesy, dower, and homestead exemptions, and in no case shall loans be made for speculation or otherwise than for the following productive purposes, to-wit:

a) To increase the productiveness of the land mortgaged.

b) To make useful improvements thereon.

c) To pay off liens or incumbrances, or to make part payment of purchase price where the borrower is paying part of the purchase money.

d) Twenty-five (25) per cent of the amount lent may be used for the purchase of stock and machinery.

SEC. 6. In making loans and taking deeds of trust provision shall be made for the payment of all or part of the loan at any interest period, and for the amortization of the debt by the payment annually or semi-annually of the interest at the rate fixed and small instalments of the principal debt at like periods, and for the payment of $\frac{1}{2}$ of 1 per cent to create a reserve fund, all so adjusted as to discharge the debt in the number of years desired by the debtor within the limit heretofore mentioned, as, for example: If the loan should amount to one hundred ($100.00) dollars and be made at the interest rate of four and three-tenths (4.3) per cent, it would be amortized approximately as follows:

Duration	Annual Payments
5 years	$22.40
10 years	12.40
15 years	9.10
20 years	7.50
25 years	6.50

If, therefore, the bank should sell the bonds for four and three-tenths (4.3) per cent, and collect $\frac{1}{2}$ of 1 per cent for the reserve fund, the loan would mature according to the desire of the borrower on the

above approximate basis of annual payments. It will be seen that if the loan were made for a period of twenty-five (25) years the borrower would pay a total of approximately six and one-half (6½) per cent thereon, made up as follows: interest 4.3 per cent, reserve ½ of 1 per cent; on the principal, 1.7 per cent.

SEC. 7. The state shall be divided into appraisement districts and the manager shall appoint, subject to the approval of the board of governors, expert appraisers in their districts. The salary of appraisers shall be two thousand ($2,000.00) dollars per annum and expenses. When an application is made for a loan an appraiser shall be designated to make the appraisement of the land offered as security. He shall appraise the land at its cash value and make his report thereon under oath without delay, giving also in said report such information as he may have concerning the applicant and the land as to the desirability of the loan. The applicant must offer an abstract of title which shall be examined by the prosecuting attorney and a report made by him in writing, giving his opinion as to the state of the title, which then shall be examined by the attorney-general and his opinion endorsed thereon. The manager may require any county officer and may ask any bank or trust company located in the county of the applicant's residence to give without charge any information desired relative to the applicant and the loan.

SEC. 8. In all cases where service is rendered by a public officer who receives a salary out of public funds, he shall perform the service without fee, and such services shall be understood to be covered by the salary paid to him. The attorney-general shall be the legal advisor of the board, and the prosecuting attorney of the county in which the land is situated shall render all legal services needed in connection with the title and with foreclosure proceedings, or steps taken for the collection of moneys.

SEC. 9. In all deeds of trust given to secure loans the state bank commissioner shall be named by the title of his office as trustee, and in case of default necessitating foreclosure, he may act in person or by attorney in fact, or by one of the state bank examiners, whose duties as examiner shall necessitate his presence in that part of the state, so that he may be able to attend at the time and place of foreclosure sale with a minimum of traveling expenses, and there shall be no charge for trustee's fees in connection with the foreclosure sale.

SEC. 10. The said deeds of trust shall likewise contain such provisions as to make it unnecessary to give notice of intended fore-

closure by newspaper publication, but that such notice may be made by handbills, and that a copy thereof shall be mailed to the maker of the note.

SEC. 11. In case of foreclosure, the bank shall have authority to buy lands at the foreclosure sale if necessary to protect it from loss but the manager shall make every reasonable effort to secure the payment of the money due the bank without buying the land.

SEC. 12. The bank shall have no capital stock divided into shares, but its working capital shall be provided as follows: that is to say: the general assembly shall appropriate out of the moneys in the state treasury one million ($1,000,000.00) dollars. When the bank shall have loaned five hundred thousand ($500,000.00) dollars thereof, and shall have on hand notes to that amount secured by deeds of trust, as herein provided, it shall have power to sell and issue its debenture bonds for like amounts. The said bonds shall recite on their face that they are secured by notes for the amounts thereof, which are secured by deeds of trust on farm lands in the state of Missouri appraised at double the face value of the said bonds, and further secured by the funds of the said bank as provided under the terms of this act.

SEC. 13. After the first issue of five hundred thousand ($500,000.00) dollars of bonds above mentioned, the bank may sell and issue a like series of its debenture bonds under the limitations herein prescribed at any time and as often as in the judgment of the manager there shall be on hand notes and deeds of trust of an amount sufficiently large to make a series. Each issue shall constitute a series and shall be designated by a serial letter or number, or by both a serial letter and number, beginning with the first issue, and each bond shall also have an individual number.

SEC. 14. Bonds may be issued on notes and deeds of trust to aggregate amount of forty million ($40,000,000.00) dollars based on the original one million ($1,000,000.00) dollars of working capital. Further issues may be made indefinitely at a ratio of $30.00 of bonds to $1.00 of the reserve as against the accumulation of the net annual reserve as hereinafter provided.

SEC. 15. The property of the said bank including capital, notes, and mortgages and also debenture bonds issued by it as provided for in this act shall all be exempt from state, county, and municipal taxes of any and all kinds.

SEC. 16. On the amount loaned to each borrower the bank shall collect at the rate of $\frac{1}{2}$ of 1 per cent annually during the currency of

the said loan, which amount shall be paid into the reserve fund out of which expenses of operation and loss, if any may be paid. The bank shall have discretionary power to refund to each borrower whose loan has run for at least ten (10) years, on full payment of his notes, the said $\frac{1}{2}$ of 1 per cent collected thereon, or so much thereof as remains after charging it with its share of expenses and loss, if any have been sustained.

SEC. 17. The said reserve fund shall as far as practicable be kept invested in bonds of the state of Missouri, of the United States, or of other states of the United States, or in such other safe securities as the board of governors may from time to time designate and the income thereof shall be added to the said fund and become a part thereof.

SEC. 18. Whenever the reserve fund shall have accumulated to an amount sufficiently large that the bank's business will not suffer by its return to the state, the board of governors shall notify the general assembly of its opinion to that effect, and thereupon provision may be made for its repayment to the state.

SEC. 19. The first $500,000.00 shall be loaned to applicants at the interest rate of four and three-tenths (4.3) per cent so that their loans will be amortized or retired according to the approximate estimate heretofore scheduled. Thereafter loans must be made at the rate which the bank shall be able to secure for the next preceding issue of bonds, and thereupon the manager shall cause to be made a new amortization table based on said interest rate.

SEC. 20. The manager may determine from time to time the length of time bonds shall run and upon what method they may be recalled so as to conform the amount of the bonds outstanding to the amount of the mortgage on hand, and there must always be a substantial agreement between the amount of outstanding bonds and notes and mortgages on hand.

SEC. 21. The board of governors shall designate the persons or officers who shall be required to give bonds for the faithful discharge of the duties required of them.

SEC. 22. [Debenture bonds approved investment for banks and trust companies handling savings and for deposit with insurance department, same as bonds of the state.]

SEC. 23. [Act not effective until December 1, 1916.]

Approved March 23, 1915.

NOTE.—The postponement of the operation of the act, provided for in Section 23, was due to the fact that there was at least grave doubt of the constitutionality of action appropriating state funds for

the purposes of a land bank and exempting it from taxes. The bill was therefore accompanied by a concurrent resolution providing for the submission of the necessary amendment of the state constitution to the voters at the regular election in November, 1916. This amendment was defeated by a vote of about two to one.—EDITOR.

253. THE FEDERAL FARM LOAN ACT

After several years of agitation and the rejection of scores of rural credit bills, Congress has at length passed a land credit measure, to be known as the Federal Farm Loan act. This act was approved by the President on July 17, 1916, and, with the lapse of only a few days, announcement was made of appointments to the board whose task it will be to organize and put the system in operation. This measure shows a certain resemblance to the Federal Reserve act, in that it provides for local loan associations, regional land banks, and a general supervisory bureau under the control and direction of a Farm Loan Board. In addition, provision is made for "joint stock land banks," analogous in function to the federal farm land banks but making it possible for private mortgage companies to preserve their existence.

ORGANIZATION OF THE SYSTEM

Federal Farm Loan Board.—At the head of the farm loan system stands the Federal Farm Loan Board. The Secretary of the Treasury serves upon this board as a member and chairman *ex officio*, and there are four other members appointed by the President with the approval of the Senate. Not more than two of these members may be chosen from the same political party, and none of them may be an officer or director of any other organization engaged in a banking or land mortgage business. The President shall designate one of the members of the board as the Farm Loan Commissioner, and he shall be the active executive officer of the board. Members shall serve for a period of eight years, and shall receive a salary of $10,000, together with necessary traveling expenses.

The powers and duties of the Federal Farm Loan Board include the organizing and chartering of land banks and farm loan associations; regulation of the rate of interest charged by federal land banks and of the charges made for appraisal, determination of title, and recording; making examinations of and requiring reports from all land banks and loan associations in the farm loan system; and supervising the issue of farm land bonds. They shall appoint a farm loan registrar

and one or more land bank appraisers for each land bank district, and such land bank examiners as shall be deemed necessary. Of $100,000 appropriated for organization expenses, they are instructed to use a "reasonable portion" for publicity purposes, familiarizing the public with the features of the new system and instructing farmers "regarding the methods and principles of co-operative credit and organization."

Federal land banks.—The second part of the farm loan system is made up of the various land banks.

Continental United States is to be divided into twelve districts, to be known as federal land bank districts. These districts are to be apportioned with due regard to the farm loan needs of the country, but may be readjusted from time to time. In each district a federal farm loan bank shall be established, in some city selected by the Federal Farm Loan Board; later, branches may be established within the district. The affairs of the bank shall be managed by a board of nine directors, six of whom shall be known as local directors and shall be elected by the farm loan associations of the district, and three, known as district directors, shall be appointed by the Federal Farm Loan Board. Directors must have been residents of the district for at least two years prior to their election or appointment, and at least one of the district directors must be "experienced in practical farming and actually engaged at the time of his appointment in farming operations within the district." No director may, during his continuance in office, act as an officer, director, or employee of any other concern engaged in the business of banking or of dealing in land mortgage loans.

The capital stock which each federal land bank must have before beginning operation shall be $750,000, divided into shares of $5 each, and may be subscribed for by any individual, firm, or corporation or by any state or by the United States. If, after subscription books have been open for thirty days, any part of the capital stock still remains unsubscribed, the Secretary of the Treasury of the United States shall subscribe the balance in behalf of the United States. Stock owned by the government shall receive no dividends, but all other stock shall share in dividend distributions without preference. Each farm loan association and the government of the United States shall be entitled to one vote for each share of stock which they hold, and no other shareholder shall be permitted to vote. After the $750,000 of capital necessary for beginning operation has been secured

by the methods mentioned above, the bank shall apply semi-annually 25 per cent of all sums thereafter subscribed to capital stock, to paying and retiring this original capital stock at par. Thereafter, stock shall be issued only to farm loan associations (or individuals who borrow through agents of the land bank, where no loan association exists) in amounts equal to 5 per cent of all loans secured by them. At least 25 per cent of that part of the capital for which stock is outstanding in the name of national farm loan associations shall be in the form of quick assets—at least 5 per cent in United States government bonds.

Joint stock land banks are organized upon the same plan as the federal land bank so far as possible. Instead of the board of nine appointed and elected directors, they have a board of their own choice, which shall not be less than five in number. There shall be at least ten incorporators, and the government shall not at any time subscribe to the capital stock of such joint stock banks. They may not issue farm loan bonds in excess of fifteen times the amount of their capital and surplus, though federal land banks may issue to twenty times their capital and surplus. Joint stock banks must have a capital of at least $250,000 subscribed and one-half of it paid in cash before they can begin business, and may not issue any bonds until the capital stock is entirely paid up. Their bonds must be readily distinguishable in form and color from those of federal land banks.

The zone of operations of joint stock banks is limited to the state in which their principal office is located, and one other state which is contiguous to it.

National farm loan associations.—It is evident that the joint stock land banks deal directly with farm borrowers. The federal land banks, on the other hand, are expected to carry on their loan operations through local associations of borrowers somewhat similar to our building and loan associations. "Ten or more natural persons who are the owners, or about to become the owners, of farm land qualified as security for a mortgage loan under this act," may unite to form such a national farm loan association: no persons except borrowers on farm land mortgages may become members or shareholders. The general management of the affairs of the loan associations shall be in the hands of a board of directors consisting of five members. Directors and all officers except the secretary-treasurer shall serve without compensation, unless the Federal Farm Loan Board shall authorize the payment of salaries. The secretary-treasurer shall attend to the routine business of the organization; he

shall collect and transmit interest or other payments, receive funds from the land bank and pay them over to borrowers, and assure himself from time to time that the funds loaned through the association are applied to the purposes set forth in the borrowers' applications. He need not be a shareholder in the association.

The capital stock of the national farm loan associations shall be divided into shares of a par value of $5 each. The total amount will depend upon the volume of loans outstanding, since a share of stock is issued for each $100 (or major portion thereof) extended as a loan, and paid off at par and retired whenever the loan is paid in full. The borrower is to be paid any dividends which may accrue on stock outstanding. He may cast one vote for each share of stock which he holds, except that no shareholder shall cast more than twenty votes. Shareholders are "held individually responsible, equally and ratably, and not one for another," for the debts and obligations of the association, to double the amount of their stock holdings. This means that they follow American practice rather than the pattern of European co-operative organizations.

OPERATION OF THE SYSTEM

Method of making loans.—The farmer who desires to secure a loan on his land has two courses open to him. He may borrow from a joint stock land bank direct, as he would borrow from the ordinary mortgage company. Or he may borrow from a federal land bank, through a national farm loan association if one has been organized in his community or if he can interest a sufficient number of other borrowers to effect such organization.[1] He may be admitted to membership "by a two-thirds vote of the directors upon subscribing for one share of the capital stock of such association for each $100 of the face of his proposed loan or any major fractional part thereof." This stock subscription is supposed to be paid in cash upon the granting of the loan, but the sum necessary to make this payment may be borrowed by the prospective member from the federal land bank, this sum to be added to the face of his loan and paid off in amortization

[1] It should be noted also that if, after the act has been in force one year, farm loan associations have not been formed and are not likely to be formed in any locality because of peculiar local conditions, the Federal Farm Loan Board may authorize some bank, trust company, mortgage company, or savings institution to act as an agent of the federal land bank of the given district and make loans for it in the locality not otherwise served.

payments, provided the total does not exceed the maximum permitted by the security offered.

Each application for a loan is passed upon by a loan committee of the association, who appraise the land, and make a detailed written report. No loan shall be approved by the directors unless all three members of the loan committee agree upon a favorable report. Before the loan is finally granted, a second examination is made by the appraiser of the federal land bank from which the funds are to be secured. National farm loan associations may loan only upon the security of first mortgages on farm land of their members and not to exceed 50 per cent of the value of the land for agricultural purposes and 20 per cent of the value of permanent, insured improvements. Loans may not be less than $100 nor more than $10,000 in amount, and the association will not be given a charter before the total of loans applied for is at least $20,000. No loans shall be made to any person who is not at the time, or shortly to become, engaged in the cultivation of the farm mortgaged, and his borrowing must be for one of the following purposes: (*a*) to provide for the purchase of land for agricultural uses; (*b*) for the purchase of equipment, fertilizers, and live stock necessary for the proper and reasonable operation of the mortgaged farm; (*c*) for buildings and improvements of farm lands; (*d*) to liquidate indebtedness incurred for purposes (*a*), (*b*), and (*c*).

The manner in which the farm loan association secures funds to loan to its members is as follows: Whenever any national farm loan association desires to secure a mortgage loan for any member, it shall subscribe for capital stock of the federal land bank of its district, to an amount equal to 5 per cent of the amount of the loan desired. This stock is held by the land bank as collateral security for the payment of the loan, but the association shall receive any dividends which it may earn. Having thus affiliated itself with the federal land bank (the resemblance to the federal reserve system is obvious), the farm loan association may indorse the first mortgage which it has received from its member, and turn it over to the federal land bank in exchange for funds. These may be either current funds or farm land bonds, at the option of the borrower. In case of default in the payment of any such mortgage, the national farm loan association is, by reason of its indorsement, still liable and must make good any loss incurred by the land bank.

Naturally the joint stock land banks are freed from the restriction upon federal land banks of loaning only to members of farm loan

associations; the size of loan granted to one person and the purposes for which loans may be made are also left to their own discretion. The interest rates which they charge may not exceed 6 per cent nor be more than 1 per cent above the rate established for the last series of farm loan bonds issued by them. Their mortgages must provide for amortization payments.

The rate of interest charged the farm borrower is not to exceed the interest rate on the last issue of farm loan bonds put out by the land bank through which the loan is secured, *plus* a charge of not more than 1 per cent to cover the cost of administration and a profit. This gross rate, however, shall not be more than 6 per cent per annum. In granting the loan the federal land bank is authorized to charge the applicant reasonable fees to cover the actual cost of appraisal and determination of title. Legal fees and recording charges imposed by law in the state where the land to be mortgaged is located may also be included in the preliminary costs of negotiating mortgage loans. These costs the borrower may pay or he may have their amount added to the face of his loan, to be discharged by amortization payments. Furthermore, each annual or semi-annual payment by the borrower shall include, besides the amount due for interest on his loan, such an additional sum as will amortize the debt within an agreed period not less than five years nor more than forty years. After five years from the date of the loan, additional payments of $25 or any multiple thereof may be made or the whole remaining principal may be paid up on any instalment date.

Issue and sale of bonds.—The method by which both federal and joint stock land banks finance their loan operations is through the sale of debentures. These are to be known as "farm loan bonds," and shall be issued by land banks only under specific authorization of the Federal Farm Loan Board. Each district is to have a farm loan registrar, appointed by the Federal Farm Loan Board, to whom land banks desiring to issue bonds may bring the mortgages which they have taken from borrowers (through farm loan associations or otherwise). If these securities are approved by the Federal Farm Loan Board, the land bank is given farm loan bonds of equal amount in exchange therefor, by the farm loan registrar. The mortgages are retained by the registrar as collateral, being assigned to him in trust by the land bank. The registrar may at his discretion allow the land bank to withdraw such of their mortgages as are paid off, and substi-

tute other first mortgages or, temporarily, to substitute United States government bonds or cash.

Farm land bonds shall be issued in denominations of $25, $50, $100, $500, and $1,000, and shall run for specified maximum and minimum periods, subject to retirement at the option of the land bank at any time after five years from the date of issue. They shall bear interest coupons payable semi-annually, at a rate of interest not greater than 5 per cent per annum. The bonds shall be prepared by the Treasury Department, but their cost assessed upon the issuing banks. Every federal land bank shall be liable for interest payments upon any farm loan bonds of other federal land banks which have defaulted in such payment, and in case either interest or principal remains unpaid after the assets of a defaulting land bank have been liquidated and distributed, such losses shall be assessed upon solvent land banks in proportion to the farm loan bonds which each has outstanding. These bonds are exempt from national, state, and local taxes.[1]

Interest, amortization, or other payments received by federal or joint stock land banks must be credited upon the mortgage held by the farm loan registrar, each such payment being reported to the registrar by the land bank. All such payments upon principal shall constitute a trust fund in the hands of the land bank; they may be applied by a federal land bank (*a*) to pay off their own farm loan bonds as they mature, (*b*) to purchase at or below par farm loan bonds issued by themselves or any other federal land bank, (*c*) to loan on first mortgages, (*d*) to purchase United States government bonds. Joint stock land banks may make similar disposition of such payments, except that in (*b*) they are free to purchase, at or below par, any farm land bonds. The securities so purchased or the cash constituting a trust fund for the ultimate redemption of mortgages must be deposited with the farm loan registrar as substituted collateral for the payments which have been made upon these mortgages. When they have been paid in full, the registrar shall cancel and deliver them to the proper land bank for delivery to the original maker or his representative.

[1] So too are the capital and surplus, or reserve, of federal land banks and farm loan associations. The capital (but not the bonds) of joint stock land banks are taxable.

XV

AGRICULTURAL WAGES

Introduction

The question of the return to the labor factor in agriculture—the wages of farm labor—is one which has not as yet been analyzed with sufficient thoroughness and penetration. Those economists who have applied themselves to the problems of distribution have naturally sought out the most clear-cut and completely differentiated cases which they could find and have secured from these near-laboratory conditions an insight into the fundamental laws which determine the amounts of the various distributive shares. But the agricultural economist must apply these theories under much more complex conditions, where the line between the laborer, capitalist, landlord, and entrepreneur functions is vastly more dubious than in incorporated industry. There is difficulty in computing the amount of the labor return in agriculture, not merely because it almost invariably is fused into a joint return from other than labor contributions to production, but likewise because it is partly paid in the form of "living," of increase in capital (without any conscious process of saving), and of numerous personal and domestic values of an intangible sort. These items are often more important than the cash return. Sections A, B, and C offer some suggestions and guidance in working out the general process by which wage rates are determined. But to understand the precise outcome of these wage-making forces in agriculture we must have careful studies from varied agricultural conditions. Only in recent years have serious beginnings been made toward supplying this need.

Far too many of the statements of labor-returns in agriculture which have passed current have dealt with the net cash income of the farmer rather than with his real wages, overlooking the value of what was consumed directly from the produce of the farm. Selections 263 and 264 indicate the progress which has been made in methods of measuring the income which the farm worker actually secures in return for his labor, and selection 265 points out some further considerations necessary to the proper comparison of one time with another to ascertain the trend of real wages.

Selection 266 gives actual figures for farm labor hired on a strict wage basis and 267 presents generalizations for all farm workers. In this connection a difficulty presents itself. Logically we must define wages as the return to the labor factor in production and, under such definition, there is a wage for the self-employed farmer as well as for his hired man. Since the amount of this wage, however, is a question of accounting rather than of bargaining, it becomes a difficult matter to get at the precise figure of the employer's *labor* income. Particularly are we puzzled to say what is truly wages and what should properly be known as profits. The present discussion, therefore, merges into that of chapter xvii.

A. Some Points of Theory

254. THE NATURE AND RATE OF WAGES[1]

By EDWIN R. A. SELIGMAN

Wages are the remuneration of labor. They are paid for the services of human beings, as rents are paid for the services of things. If by price we mean value in the market, wages are a price just as rent and interest are prices. The law of wages must be like that of rent and interest, for the law of all price is the same. Wages, however, differ in some respects from rent and interest. Net interest is always the same in a given market, being the price paid for the use of an aliquot part of a homogeneous fund. Wages, however, vary with the kind of labor. The wages of the skilled workman are higher than those of the unskilled; the wages of the foreman shade into the salary of the manager. On the other hand, wages differ from rents. Rents vary from zero to prodigious sums. Human beings, on the other hand, must live. The recompense of labor must be large enough to enable the workman at least to exist. Wages therefore cannot fall below a positive minimum which is absent in the case of commodities.

Wages, although they are undoubtedly prices, may yet be usefully contrasted with the prices of things. Labor is a commodity in the sense that everything which has a price is a commodity. Labor, however, is a peculiar kind of commodity. The chief peculiarities are four in number. (1) Commodities are produced for the services which they render. The increased supply of human beings is not due to any such consideration. (2) A commodity once in existence

[1] Adapted from *Principles of Economics* (3d ed.), pp. 411, 416–20. (Copyright by Longmans, Green, & Co.)

continues to give its services unbidden; a laborer may work or not as he lists. Commodity takes no holiday and does not strike. The mule and the slave respond to the lash; harsh treatment of the workman may diminish rather than augment output. (3) Labor is perishable while many commodities are durable. After the lapse of a certain time a laborer must sell his labor or starve. Laborers and capitalists need each other, but under normal conditions the need of the laborer is more urgent. (4) Finally, labor is inseparable from the laborer, while the commodity may be separated from its owner. Commodities are sold wherever the owner desires; labor can be sold only where the laborer is.

In order to reach a consistent theory of wages we must revert to fundamental principles. All things possess value because of the services which they render. The value of all production goods depends on the value of the consumption goods. Production goods, however, are composed not only of concrete objects, but of labor. Labor, therefore, has a value because its services or products have a value; it secures a remuneration because it produces something for which people are willing to pay. In other words, wages depend on productivity.

The value of labor, however, like the value of all things, is affected by marginal increments. If a man applies his labor to land which is so abundant that it can be had for the asking, there will be no rent of the land, and the value of the entire product will consist of wages. By increasing the number of workmen, the product may be more than proportionately increased, because the plot may be large and several laborers in co-operation may establish so much better results that the share of each will be greater. After the point of maximum utilization has been reached, however, the law of diminishing returns will assert itself, and each additional laborer will add relatively less to the product, until if the product were continued long enough a new laborer would make no new addition at all. The process will never actually be carried to this point. At any given time, however, there is always a final or marginal workman who is making some contribution to the product. If there is free competition and if all the laborers do their allotted task equally well, so that there is no choice between them, the share of the product ascribable to any of the workmen must be equal to the additions made by the last or marginal laborer actually at work. Since the value of the entire product is here due to labor, the rate of wages is equal to the product of the marginal laborer. Wages depend on marginal productivity.

In actual life, indeed, the quantities of land and capital are fixed just as little as is the number of laborers. The marginal employment of laborers will therefore depend not alone on the amount of labor, but on the amount of the other productive factors. For these are all competing with each other. At a certain point in the process of increasing the number of workmen on a given plot of land it will be more profitable to use more land instead of more workmen; and as the better land acquires a value, a part of the product will consist of land rent. In the same way at a certain point it will pay better to use more machinery, so that an increasing part of the product will consist of the rent of the machinery or of the interest on the capital invested in it. And if there are continual temporary changes going on, a part of the product will take the shape of profits to the entrepreneur. All this, however, though it may obscure, cannot prevent, the fact that there is always a point of marginal employment of labor, and that at this margin there is the certain part of the product ascribable to labor. The normal rate of wages, that is, the amount to which wages tend to conform under conditions of free competition and mobility of both capital and labor, is the amount of value which a given increment of labor produces at the margin.

It may be claimed that the productivity of anything at the margin depends on relative scarcity. Scarcity, however, connotes supply, and the supply of labor, like that of other things, depends on the cost of production. This raises the question of the cost of living, and the cost of living at any time is affected by the standard of life. The standard of the Chinese coolie differs from that of the American workman; the standard of the farm hand from that of the factory operator. When the cost theory of wages is couched in terms of the standard of life theory it loses the pessimistic connotation of the old minimum of subsistence doctrine. For if wages vary with the standard of life, anything which lifts the standard will raise the rate of wages.

In reality, however, the standard of life cannot accomplish the impossible. The highest standard will not prevent wages from falling in the face of a decrease in the demand for the product and a decline in industrial prosperity. If the employers cannot sell their product at a given price, they must lower the cost or abandon the business. From this point of view the cost of labor is like the cost of anything else; it must adjust itself to the price.

The standard of life theory and the productivity theory may thus be declared complementary. They are both true in the sense that

the cost and the utility theories of value are true. Cost seems to be the cause of value, but is in reality a measure rather than a cause. The rate of wages may be expressed in terms either of marginal productivity or of the standard of life, but the positive force is productivity.

The standard of life, however, is of exceedingly great importance. It often serves as a dyke to prevent for a time at least the inundation of the field. With ordinary commodities, a newcomer who can produce the same goods at lower cost will reduce the price. To the ordinary producer low cost of product means high gains; to the laborer low cost of the product, that is, low wages, means low gains. It is only where the newcomers are habituated to a lower standard and where the exigencies of the situation force them to accept the smallest sum the employers will give, that the real difficulty arises. Thus women's wages are frequently lower than men's, not only because in some occupations women produce less than men, but also because, even where the product is the same, the woman's standard of life is lower in that she is generally not the support of the family and is often not entirely dependent on her earnings. In the same way the immigrant receives lower wages than the native workman, not only because his contribution to the product is frequently less through ignorance or lack of skill, but because his standard of life is so much lower that he will be willing to work for less—at least until he becomes educated up to the new standard of life.

255. THE LABORER'S SHARE IN DISTRIBUTION[1]

By A. W. FLUX

We have now to consider the application of the principles developed in the general discussion of value to the special case of labor, that is to say, to study the problem of wages. In doing so, we have, as in the preceding chapters, to give our attention to the demand and supply sides of the problem in turn. We take up first the demand side. What can an employer afford to pay for labor? The obvious and direct answer is, As much as the labor is worth and no more. This, however, requires closer examination.

Labor is generally associated with capital and land in production, and we need to form a conception of the value of the contribution to

[1] Adapted from *Economic Principles*, pp. 118-30, 134. (Used by permission of the publishers, E. P. Dutton & Co.)

the joint product, which labor makes. Then, too, different kinds of labor, paid at many different rates, are employed together, and the contributions of the various grades to the total result must be disentangled from one another if we would know what each grade is worth.

Let us consider first the case of a group of laborers performing similar tasks. If their numbers can be increased or decreased slightly, without a change in the rest of the apparatus of production with which they are associated, the consequent change in the product can be directly attributed to the change in their numbers. The loss in product due to a loss of a workman, or the gain due to the addition of a workman represents that workman's effective product. But this can only be maintained if the change of numbers does not involve leaving some machinery or other productive appliances wholly or partially idle, that is, if the removal of a workman simply removes his own contribution to the product and not, in addition, that of a machine or some part of that of other workmen. In conceiving of a man's net product, we must, therefore, either conceive of a case where no readjustment of appliances to numbers using them is needed when one additional man is added to, or subtracted from, a working group, or else we must make comparison between two cases, the one where the available capital is given the forms needed for setting a larger number of men at work, the other where the same amount of capital is represented by appliances for a smaller number. When the larger and smaller numbers differ by unity, the difference in the product of the two groups is due, not to a difference in any other element, but purely to the difference of a workman more or less, and we may, therefore, reasonably call the difference the net product of that man's labor. If we may assume a knowledge of the interest on capital, the conception may be made simpler. We have merely to observe the difference in product due to the removal of one workman, to determine further the capital rendered idle by his removal, and, after assigning, from the total decrease of product, so much to capital as will account for the interest and depreciation on the capital thrown idle, attribute the remainder to the workman.

In the case of the ordinary workman, whose place could be taken by any one of his fellow-workmen, it will be clear that the question of the amount of his net product is one which is not concerned with himself personally, but that any one of those who could replace him or whom he could replace must be regarded as having the same net

product. Each in turn may be regarded as the last added, but the rate of all will conform to the productivity of the one actually added last, whether under conditions of increasing or of diminishing return. When, on the other hand, we have to deal with exceptional kinds of work, for which the available men capable of performing the work are few, the device for determining the individual contribution to the total product, to which recourse has been had above, is no longer necessary. The work of the individual being able to be more directly associated with its result, we are not met with any great difficulty in answering the question: What is the net product of a man's work? It was for the purpose of providing an answer to this question that it was necessary to give attention to marginal productivity when dealing with masses of men who, as individuals, could not be dealt with, since they formed indistinguishable parts of a mass of workpeople, that is to say, parts indistinguishable for the purpose of assigning a distinct part, or a distinct share of the value, of the product to the work of the individuals in question, by any other method than the division of the value of the product by the number of those engaged in producing it. The value so divided would need to be disentangled from the productive contributions of other classes of workers, of capital, etc., and the preceding discussion is designed to afford a means for handling some of the obvious difficulties which the problem presents.

We pass now to the consideration of the features which call for attention in reference to the supply-price of labor. This term is used to denote that price which will suffice to evoke a volume of supply adequate to the need at that price. Generally speaking, with a change in the supply needed, there will be a change in the corresponding supply-price. It may also be noted that this price is generally only one of the features which serve to influence the volume of labor available. Hours of labor and conditions of employment, for example, may be such as to either add to or detract from the attraction of a given price offered.

As affecting the supply of labor, we need to distinguish clearly between the two kinds of problems we may have to consider. The supply-price may have reference to a supply, attracted to a given place and industry from other places, and from such other industries as can supply labor suitable for the ends in view. It may, on the other hand, be used in reference to the training of boys to a particular trade rather than to any of the other trades among which they are

practically able to choose; or even to a stimulation of a general increase in population by increase of births, resulting from the encouragement of marriages among young people due to generous remuneration of labor, whether the labor be self-employed or hired out to a master. In the first of the problems, the attraction of high wages in a particular industry or locality needs to be sufficient to outweigh the similar attraction of other industries, and also, perhaps, the common disinclination to change trade or place of residence, a disinclination which, though common, is not universal. Further, the number of hours in the day, days in the week, or weeks in the year, which are devoted to work is affected by the rate of remuneration secured. When these various features are taken into account, the range of elasticity of supply of labor can be estimated. The whole supply procurable may be such that its productivity is considerably greater than the equivalence of the price which is adequate to divert it from other employments and induce sufficient continuity and vigor of work. In this case the marginal demand-price may exceed the corresponding supply-price. Should rival employers be bidding keenly against each other for the control of such a supply of labor, the tendency would be for wages to be placed at a figure well above the lowest which would suffice to secure the requisite supply but for such competition among buyers. Again, if the sellers of the labor be conscious of the advantage they enjoy by such relative scarcity, and if they are good bargainers, or have enough of such among them to set a standard for the best, or be associated for the purpose and led by a good bargainer, they may secure for their labor a price well above what would suffice to prevent them from withdrawing part of the supply, though, of course, not exceeding the marginal demand-price determined by the productivity. If the employer were actuated by motives which made it important to secure labor even at a price which involved pecuniary loss, the wage might for a time go beyond even the equivalent of the marginal productivity.

In a manner corresponding to that which affords peculiarly advantageous conditions to labor which is scarce, conditions exceptionally unfavorable may affect bodies of laborers who are unable or unwilling to transfer themselves to other localities or trades when their own occupation ceases to be profitable. A price for their labor which would not have sufficed to bring them into the trade or locality may yet fail to reduce the supply to an amount which can be profitably employed at such adequate wages. The oversupply will lead to one

of two results. Part of the laborers may be without employment, and thus constrained by exceptional pressure to remove themselves from the overcrowded trade or locality. Or, the whole may find employment at wages reduced to the level of the marginal productivity of the excessive supply.

In what has preceded, reference has been made to the adjustment of the supply of labor, as between different trades, by influences affecting the choice of trades by young men just entering on life. A few years may make a considerable difference in the supply even of highly skilled labor, if strong inducements exist to select one branch of work rather than another at the moment when choice is least hampered. Later, a sacrifice of acquired skill must be made by a workman who seeks to change his trade, and such changes are therefore hindered, quite apart from any customs, or union rules, requiring definite apprenticeship, perhaps before a definite age. Though individuals be not free to choose from a wide range of employments, the ability to choose among a small number may have important effects in changing the distribution of labor from one generation to the next.

The question of whether a given level of wages will suffice to maintain the supply of labor introduces the consideration of the standard of living among the recipients of the wages. What will be the result if the remuneration of labor fall short of the amount demanded by the standard of living? This amount suffices to provide the necessaries and comforts of life according to the habits prevalent among the workers, and includes provision for the maintenance of a family. The former is implied in the supposition that personal ability to labor is maintained, for when expenditure is reduced, some reduction takes place, in practice, in the expenditure which contributes to efficiency, as well as in that which has its chief object in affording satisfactions secured for their own sake. What has become conventionally necessary is yielded up with as great reluctance as what is demanded for the satisfaction of primary needs. The inclusion of provision for a family in the conception of the standard of living is demanded by the consideration that we are examining the conditions of existence of a class, not of individuals. That the class may be maintained in undiminished numbers, provision must be made for the rearing of children and their industrial training. Wages must, in fact, cover the necessaries of the wage-earners and of the dependent members of the class as well, those too young to earn, those engaged

in rearing children, those too old to support themselves. The wage which affords the means of attaining to the standard of living of the class is the supply-price of the labor of that class, and the preceding remarks have reference to this fact rather than to anything specifically stated in the words "standard of living."

If wages, then, fall below the amount needed to maintain the class standard, the supply of labor will be reduced, either in amount, or in efficiency, or in both. Privation may render the members of the class more liable to attacks of disease, increasing the loss of working time from that cause, and resulting in earlier death or incapacity. Reduction of the more essential parts of consumption reacts on the efficiency of labor, which is also affected by the moral or intellectual attitude of workmen in reference to work which they regard as inadequately remunerated.

In addition to these influences on the working efficiency of the living, it is necessary to consider the influence of reduced means on the natural increase of numbers. Though it may be true that some classes are reckless in regard to the responsibilities of parentage, and that, in consequence, their birth-rate shows no response to decreasing prosperity, the more intelligent members of the wage-earning classes, perhaps all except the very lowest grades, are influenced in this respect by adversity. A fall in earnings operates to retard marriage, since the class standard of family life cannot be supported on the reduced earnings. How general this influence is can be seen by comparison of the marriage-rate in prosperous and dull times.

Wages cannot permanently exceed the value of the net product of labor at the margin of employment, and competition tends to make the two coincide. Wages, too, cannot permanently fall below the amount needed to maintain the standard of living of the class to which the labor belongs, and competition tends to make these two also coincide. As, in the general problem of value, utility and cost of production each tends to equality with exchange value, so too in this special case. The utility here is measured by the value of the product of labor at the margin of employment, while the cost of production includes the cost of the necessaries and comforts of life usual in the class to which the workman belongs, together with such luxuries as are also customary, the workman's family as well as himself needing support as a condition of the continuity of the labor supply.

B. Concerning the Demand for Labor

256. VALUE OF PRODUCT AND THE SCHEDULE OF DEMAND FOR LABOR[1]

By GEORGE K. HOLMES

The farmer has hardly been able to attract labor to the farm; the most that he has been able to do has been to hold labor with varying degrees of failure. Competition has forced him to raise the level of wages since the Civil War, with some retrogressions in periods of severe industrial depression. A diminishing cost of production of farm products may have sustained farmers in paying higher wage rates, but practically nothing is known with precision with regard to the trend of the cost of products. An increased value of production per worker would help to sustain higher wage rates. An increased value of product per worker may be due to higher production of concrete commodities per worker or to higher prices of commodities produced or to both of these causes. It appears from an examination of data covering value of products per worker by geographic divisions, that there is at least association, if not the relationship of cause and effect, between high and low farm wage rates, respectively, and high and low average value of product per worker. From lowest to highest wage rates and from lowest to highest average values of agricultural products the geographic divisions maintain the same order. Whether the higher average value of products per worker causes the higher average wage rates, or only makes possible their existence, is a matter for argument which does not enter into the scope of this bulletin.

In the period of nearly half a century under consideration, during which farm labor passed from abundance to scarcity, relative to the demand for it, there have been some changes in the areas of farm holdings, and it may be worth while to examine these in connection with the relative diminishing labor supply. Theoretically, the tendency is toward confinement to the labor of the operating family.

In the North Atlantic States from 1880 to 1910 there was a relative increase in the number of farms containing less than 50 acres, and a relative decrease in the number of farms containing 50 and under 500 acres. The same general statement with small exceptions applies to the western group of states.

[1] Adapted from *Bulletin 94, Bureau of Statistics, United States Department of Agriculture*, pp. 44–54, 72–73.

In the North Central States there is no decisive tendency with regard to the relative number of farms containing less than 50 acres, but the decline in the relative number of farms containing 50 and under 100 acres is marked; and there is an increase in the relative number of farms containing 100 acres and over.

It appears that in the South Atlantic States the number of farms containing less than 50 acres relatively increased steadily from 1880 to 1910, and the same is true of the class of farms containing 50 and under 100 acres. The contrary tendency is also observable for classes containing 100 acres and over.

Relative increase in the number of farms containing less than 100 acres is observable in the South Central division of states with a steady contrary tendency in the case of farms containing 100 acres and more. The two southern divisions of states are characterized by the same tendencies.

In the average for the United States, the increase in the relative number of farms containing less than 50 acres, during the thirty years covered by the census, is fairly established. On the contrary, farms containing 50 and under 100 acres have declined in relative importance. There was an increase of relative importance in farms containing 100 and under 500 acres from 1880 to 1890, after which there was a decline. The very large farms appear to be slightly increasing in relative importance, but these farms are hardly 3 per cent of the total number. On the other hand, the very small farms, or those containing less than 50 acres, are increasing in importance and now comprise more than one-third of the nation's farms. The intermediate farms, or those containing 50 and under 500 acres, have declined in relative number.

It is interesting to turn to the great agricultural region in the North Central States. Improved area of farms in those states gained in average area from 80.59 acres in 1880 to 101.21 acres in 1900, but the average number of agricultural workers per farm remained about the same, while the average number of acres per agricultural worker increased from 50.4 acres in 1880 to 59.8 acres in 1890 and 63.9 acres in 1900.

Increase of improved acreage per worker is observable also in the South Central division from 1880 to 1890. There was an increase also in the South Atlantic division from 1880 to 1890, followed by a contrary tendency. In the North Atlantic and Western divisions there has been a marked tendency toward a smaller acreage per worker.

Farm implements and machinery, in the use of which animal labor is employed, as well as that of men and women, have been the means by which the agricultural labor of the United States has enormously increased its productivity, and so made possible higher rates of wages. The value of implements and machinery on farms increased from $406,520,055 in 1880 to $1,265,149,783 in 1910, and each intermediate census recorded an increase over the preceding one. It is true that the increase of value of implements and machinery on farms is not an accurate measure of increase in their number, for the reason that prices change, but it is a fact that the implements and machinery used in agriculture have steadily increased in efficiency and have constantly made human and animal labor applied to agriculture more productive. If prices have increased, the increased investment of farms in implements and machinery implies an increasing dependence on these aids to labor and is an evidence of their economic gain in production.

In pursuing the nineteenth investigation of farm wage rates throughout the country for *Bulletin 99*, many thousands of correspondents were requested to mention the special manner of farming and the special crops that enabled farmers to pay the higher wages and get the better laborers. The information received in response to this specific inquiry is not uniform and, indeed, cannot be so in a country possessing the great variety of agricultural and market conditions found in the United States. The general fundamental fact, however, is that the higher rates of wages in any community or larger region are sustained by the more intensive agriculture. This kind of agriculture embraces the more profitable lines of production in each community or larger area and probably the intensive methods are the cause of the profitable results. The intensive agricultural method carried on by intelligent men sustains a higher agricultural wage rate.

The question was, "What special manner of farming and what special crops enable farmers to pay the higher wages and to get the better laborers?"

The state statistical agent for Maine reported that this question would be answered differently for the different counties of the state, and that in Aroostook County the advantageous product is potatoes; in other counties where butter factories are in operation that dairying would be the favored specialty, while in still other counties it would be sweet corn for canning. In Vermont the higher wages are found

in market gardening, dairying, and fruit harvest; in truck farming, and dairy farming on a large scale in Rhode Island; while in New York the best fruit growers, particularly those who market their product at retail, truck farming, and the breeding of pure-bred stock were designated.

The special agriculture that sustains the higher wages in New Jersey is fruit growing and general trucking; in Delaware, fruit growing combined with potatoes, both sweet and white; fruit growing and trucking in West Virginia.

From the state statistical agent for South Carolina the answer is, "intensive diversified farming, planting of cotton, corn, and small grain, with hay and stock raising"; from Ohio the report is, "Diversified farming with well-planned rotations enables the farmer to employ help for the whole year; more intelligent laborers may be employed and higher wages paid."

The situation is thus described in North Dakota: "Our grain farmers pay rather the higher wages, but our mixed farmers are better able to pay higher wages and they get the better men on account of their assurance that men and women will have work for the entire year."

In Kansas, as well as in other states, wheat harvest pays the highest day rates of wages; otherwise the farmer who so manages his affairs as to be able to employ a man throughout the whole year is able to get the better quality of labor and must pay the highest rate.

In Alabama, "the laborer, good, bad, or indifferent, prefers to cultivate corn and cotton." The rice laborer is paid the best wages in Louisiana for the reason that this crop requires more skilful laborers than others do; the land is plowed with gang plows; disk harrows are used; the grain is seeded with seeders and then harvested with harvesters and binders.

It is the observation of the state statistical agent for Washington that "fruit growing appeals to the men of a higher order of intelligence, and the competent man in this line is paid the best wages." In Oregon, dairying appears to secure the better laborers on account of steady employment, but the commercial apple growers also are able to pay higher wages, and perhaps as a class pay the highest.

From every quarter the crop correspondents have observed that the higher wages and ability to select the better laborers are found on farms managed in the more intelligent ways and on which the cultivation is of the more intensive sort.

257. SEASONAL DISTRIBUTION OF LABOR IN RELATION TO DEMAND[1]

By W. J. SPILLMAN

The American farmer has seldom solved the problem of distributing his labor through the year in such a way as to have it profitably occupied at all seasons. Many farmers who have attempted to follow a rotation have abandoned the effort. It is probable that the lack of regular rotations is partly due to the fact that some of the most important crops of the country, of which most rotations would naturally consist, compete strongly with one another in the matter of labor required at certain seasons of the year. For instance, in central latitudes the cultivation of corn is still in progress when wheat harvest begins, and timothy and clover, the principal hay crops of the country, demand much labor almost simultaneously with wheat as well as with oats. This makes it necessary to lay by the corn long before the proper season and requires an enormous amount of work during the latter part of June and the early part of July, but leaves the latter part of the summer poorly occupied. This renders necessary the hiring of extra labor in June and July, while at some seasons there is not enough work to keep regular labor profitably employed.

One of the hardest problems the farmer has to face is that of labor. Reliable labor cannot always be had even under the best conditions. Where the cropping system is such as to require an excess of labor at one season and little or no labor at other seasons it is necessary to depend on transient labor, which is almost always of an undesirable character. In the North, where field work is precluded for a considerable portion of the year, because of the long winter season, the problem of finding employment for labor the year round has led to the extensive development of winter feeding and winter dairying. The winter feeding of beef cattle and sheep is particularly adapted to this purpose. Dairying solves the problem as far as the winter season is concerned, but it also consumes time in summer when field work is abundant and therefore does not balance up the work of the year quite as well as winter feeding does, though in many cases it may be more profitable.

Many farmers have developed some form of employment as an adjunct to their farming operations in order to give regular employment to their labor and thus be able to keep on hand dependable men

[1] Adapted from *Yearbook of the Department of Agriculture*, 1911, pp. 270–74.

when they are needed on the farm. One farmer has a stone quarry which is worked only when the labor on the farm is not sufficient to give employment to the men. Other farmers make brooms in the winter and at odd times at other seasons.

In the middle latitudes and in the South it is possible to plan cropping systems that will give regular employment to labor without these side industries. In this manner the area of land which one man or any definite number of men can farm is greatly increased. This means a larger yearly income per individual employed. Even if a crop grown returns a very small profit, if the work it demands comes at a season when the farmer would otherwise be idle, it adds just so much to the farm income without appreciably increasing the expenses. Other things being equal, those farms which have the largest variety of products to sell are the most profitable. The main reason for this is that these farms have a variety of interests that permit the farmer and his family and his hired labor to find profitable employment at all seasons of the year, while on farms with less varied interests there are frequently periods when there is no profitable employment.

Speaking in a general way, a system of farm management which calls for approximately the same amount of labor at all seasons of the year not only greatly increases the area which a given force can farm, but, in many cases at least, increases the income of the farmer in approximately the same proportion. Hence, under most conditions it is wise for the farmer to follow a system that will give his labor permanent employment. There are instances where farmers deliberately grow crops that are not profitable in order to keep their labor employed so that they will be at hand when needed on crops that are profitable, and this course appears to be justifiable under certain conditions.

There are a few crops, such as cotton, and alfalfa in certain sections, that of themselves furnish employment during nearly the whole year. This is one of the reasons why the single-crop cotton-growing system has been able to persist indefinitely in our Southern States. But even in the case of cotton a farmer can grow some winter hay and other crops to a considerable extent without decreasing the acreage of cotton he can manage, and thus increase considerably the area of land he can farm properly, as well as his annual income.

So to plan the work of a farm as to distribute the labor equally throughout the year is no small task. The difficulty of doing so is attested by the small number of farms on which this task has been

accomplished. The difficulty is increased by the irregularity of the seasons. In any case, the best that can be done is to make plans that are suited to a normal season and adjust them from time to time as the exigencies of the weather may require.

In order to formulate a cropping system that will give a satisfactory distribution of labor during the season when field work is practicable, a wide acquaintance with crops and a knowledge of the dates of planting, tilling, harvesting, and all other operations connected with each crop are required. One must also know the amount of labor required for each of these operations, the number of men that must work together to accomplish the work economically, as well as the average percentage of days available for field work at different seasons of the year. If the work schedule is to include the care of live stock it is also necessary to know the amount of labor required for the various kinds of work as well as the seasons at which this labor must be performed.

Occasionally one finds a farmer who has followed a system of farming long enough and has observed with sufficient care to enable him to know in advance just how much labor will be required during every part of the coming season. It is very seldom, however, that such a farmer has succeeded in filling in all the gaps during the season, so that on the vast majority of farms there are times when the need of labor is greater than the supply, while at other times little or nothing is to be done except the daily chores. So many unforeseen accidents interrupt the regular farm work, often bringing unexpected demands for time and labor, that it would not be possible to follow blindly any work schedule outlined in advance. At the same time it is possible to outline a plan that will serve well as a guide in the management of the farm. A little attention to this subject serves to show that the area which a given force can farm when the work is thoroughly systemized is very much greater than is generally supposed.

258. MAKING LABOR GO AS FAR AS POSSIBLE[1]

By J. A. DRAKE

Labor in itself constitutes one of the hardest problems encountered on the average farm. Not only is this now true, but the situation seems to be growing more serious each year. The cost of extra labor

[1] Adapted from *Farmers' Bulletin 614, United States Department of Agriculture*, pp. 1–3.

is becoming greater, and efficient labor on the farm is more difficult to secure when needed most. Transient labor for the general farm is very unsatisfactory. As a rule, also, it is not convenient or profitable to keep the necessary extra labor throughout the entire year, even if it were available. This condition must soon result in the reorganization of a large number of farms throughout the corn belt, and in other sections as well. The main features of these changes must be (1) a better distribution of labor throughout the entire season and (2) systems that will reduce the extra labor required at certain critical seasons of the year to a minimum.

The average corn-belt farm must be devoted largely to the growing of staple field crops, such as can be planted and cultivated by machinery and handled on a large scale. There is little place in that region for crops that yield a big income per acre, such as truck crops and small fruits, except in a few localities close to cities, where good markets are available. The tendency in most sections is for the labor of the farm to be done by one man or by one man and his family. Occasionally it is done by the owner or tenant and a hired man. It is growing more imperative that the efficiency of one man be increased as much as possible in such operations as plowing, planting, and cultivating the farm crops, and that all the labor possible be eliminated in the harvesting of these crops, in order to cover a greater acreage effectively and at the same time to use the greatest economy in the employment of outside labor.

Already this has given rise to certain well-formed and definite systems which include these elements as prominent features in the management of the farm. In several widely separated places practically the same system has been worked out by farmers themselves as they have been forced gradually to meet present conditions. In all these instances 3- and 4-horse machinery is being rapidly substituted for that of the 2-horse type, in order to double the efficiency of each man employed. Crops are being grown that do not compete for labor. Live stock is being used in every possible way in the harvesting of the crops produced, thus eliminating to a very great extent the necessity of hiring extra labor. The system provides productive labor for practically the entire year and at the same time so distributes this labor as to make it possible for one man, practically without hired help, to handle a large acreage (possible 240 acres), making a net income considerably greater than is at present commonly obtained in the Corn Belt States. This system also rapidly

increases the productiveness of the land and is designed to conserve soil fertility to the greatest possible degree.

The system in itself is very simple. Only three different crops are grown, and these follow in a 4- or 5-year rotation that is easily managed. The crops are corn, rye, and a mixture of clover and timothy, or clover alone, as is thought best. The ease with which the labor of such a rotation is taken care of is very evident. Corn is the first and only crop to receive attention during the spring and early summer until time to lay it by, at which time hay harvest begins. Since the rye is harvested later by the hogs, there is nothing to correspond to the wheat harvest, which always comes at about the time the corn crop should be given its last cultivation. Haying, then, is the only job to look after from the time the corn is laid by until it is necessary to cut corn or sow the fall grain, which in this case is rye. Thus the program is not crowded, and each crop can have its due attention without rushing or slighting any part of the work. This makes it possible for a given crew to handle the maximum acreage with the least possible expense for outside help, thus increasing the labor income.

259. THE LABOR DEMANDS OF INTENSIVE AGRICULTURE[1]

By H. A. MILLIS

The need of California farmers for an abundant supply of unskilled, cheap laborers results from the intensive character of the agricultural crops grown, the large scale on which these intensive crops are produced, and the conditions under which they are marketed. The agricultural products of the state, in the growing of which there is much specialization, are practically all of them crops which at some stage in their production require a great deal of hand labor. They require either intensive cultivation and much care while growing or involve a great deal of hand labor in the harvest. This intensive agriculture is well illustrated in the cultivation of sugar beets. As soon as the beets develop two leaves they must be thinned by workers who cut out the surplus plants with a short-handled hoe and loosen the earth around each remaining beet. Later in the summer laborers are employed on two separate occasions to hoe the weeds from the growing beets, and in the harvest many hand workers are required for pulling, topping, and loading the beets upon wagons. The gathering of the grapes of the vineyards involves much labor, and after the

[1] Adapted from *Reports of the Immigration Commission*, XXIV, 6–8.

harvest the pruning of the vines requires hand workers. The citrus-fruit orchards demand more than the ordinary amount of cultivating, and in gathering the oranges and lemons a great many men are needed, for the picking and packing must be performed with care. Much labor is necessary also for the picking and packing of the deciduous fruit and for pruning the trees. In preparing such fruit for drying, the cutting and sulphuring gives employment to many more persons, especially women and girls employed in cutting. Beans must be hand-hoed once or twice during the summer, and later, in the threshing, many men are required. The growing of hops involves much hand labor in the pruning, stringing, and training of the vines, and later, a very much larger force is necessary for the picking. It is generally stated that where two men can do the plowing and cultivating 50 men are required for the hand work of pruning, stringing, and training vines in the hopyards. A still larger number are needed during the short harvest season. Asparagus, celery, figs, and nuts also require extra hands for seeding, cultivating, or harvest. Strawberries are one of the most intensive crops grown. Finally the irrigation of fields and orchards requires considerable care and many men are employed for that work alone.

The matter of securing an adequate number of laborers to perform all of the intensive handwork required in connection with these crops is the more difficult because of the specialization of most communities in one or more of these crops, the seasonal character of the work, and the temporary demands in allied industries at the same seasons, and because the supply of laborers permanently located in these districts is hardly adequate to supply the need of regular farm workers and temporary laborers in canneries and packing houses in the towns. Because of their climatic conditions, soil, and topography certain districts in the state are best adapted to certain of these crops, and the majority of farms of these districts specialize in the one or more intensive crops to which they are best adapted. Any one of these specialized branches of agriculture does not as a rule require many laborers throughout the year, but only certain processes at various stages of growth make an urgent demand for workers, and in a district specializing mainly in one crop this demand for large forces of men on many ranches comes within a short period of time. Not only do the farms require these additional workers for the short harvest seasons, but dependent upon many of these products there are also factories and canning and packing establishments, which

require extra laborers to operate them at the same season in order to handle the crop as harvested. The towns in these agricultural districts are usually small, and their surplus labor supply is employed almost entirely in these allied establishments. The specialization of most agricultural communities limits the demand for many laborers to short seasons, and there are usually no other industries to keep many extra men there after the seasonal ranch work and canning and packing-house work are finished.

C. Forces Affecting the Supply of Agricultural Labor

260. SOME FACTORS CURTAILING THE SUPPLY OF AGRICULTURAL LABOR.[1]

By ALFRED H. PETERS

There is a marked disaffection on the part of a growing number of eastern-born men and women toward agriculture as a vocation. The slow and moderate return upon capital invested in agriculture is one cause of this disaffection. Whosoever follows any vocation solely for the amount of money it may yield, can exercise his powers to that end in many other ways better than in agriculture. The Hebrew, that unerring scenter-out of gain, never is a husbandman. The homage paid to wealth in the Northern United States for the last quarter of a century has turned into the ways most productive of gain the greater part of those young men whose career is generally determined by the common ideal.

Another cause of disaffection toward the agricultural life is its isolation. The young people envy the easier intercourse of the town, think their own life dull, and want to live where it is not so lonesome. The day laborer in a great town may fare better, find better schools, and, dearest of all, behold a thousand times more of the passing show than the small agricultural proprietor in a remote country region. A man who had served at different times as valet, waiter, barber, usher, and what not, was heard to say that, in case of need he would do anything except work on a farm. It was living, as he would have said, "out of the world," away from the novelty and fashion and excitement—the only world he could appreciate.

A further cause of disaffection toward the agricultural life is the growth among us of physical squeamishness and tenderness of the

[1] Adapted from the *Quarterly Journal of Economics*, IV (October, 1889), 27–30.

person—a disposition to avoid contact with nature in the gross, with whatever is sharp or rank or rugged. It is probable that more young Eastern and Middle States countrymen today would rather hire themselves out to stand behind counters, or to sit in boxes selling tickets, than to become foremen to farm proprietors at the same remuneration, or even to become small farmers on their own account. This is not from an aversion to physical exercise. These same young clerks and ticket-sellers are, most likely, members of some boat club or gymnasium. It is largely because of the more polished appearance which they are enabled to affect, and a readiness to endure those things which offend man's spirit, rather than those things which offend his body.

Still another cause for the dissatisfaction toward agriculture as a vocation is the decreased importance of the agricultural population, socially and politically, as compared with the members of other callings. The farmer's local influence is less than that of the trader or manufacturer or contractor. He who in numbers and in the proportion of his taxes is first is, for all purposes of official distinction, considered the least. All roads toward distinction lead away from the farm. Aware of his diminished consequence in the world of politics and affairs, the farm proprietor emulous of distinction, if unable to forsake it itself, desires that his sons shall follow almost any other calling than his own.

261. THE COMPETITION OF NON-AGRICULTURAL EMPLOYMENTS[1]

By GEORGE K. HOLMES

Farm labor in this country has presented the problem of a diminishing supply relative to population since the days of original settlement. It is the old familiar feature of the industrial nations of the world. Until recent years the problem was almost entirely confined to the quantity of the supply, but during the last decade or two it has assumed a new phase in which not only the amount of the supply relatively has almost critically declined, but the quality has almost absolutely declined, or has failed in an important degree to keep pace with the need for labor, more skill, and more intelligence.

In spite of all that the farmer has done or been able to do, there has been a drift of labor from farm to city and industry, and the

[1] Adapted from *Bulletin 94, Bureau of Statistics, United States Department of Agriculture*, pp. 38–41.

potential supply of farm labor has been diverted from the farm. The movement of farm labor to town and city, and to industry and transportation, is to be accounted for quite as much by the student of psychology as by the student of economics. To the farm laborer who has been in the city little if at all, there is a glamor in city life which has a powerful influence upon his volition. The case is similar to that of the boy who runs away from home to hunt Indians. When this is joined to the greater nominal rate of wages that can be earned in the city, the combination of a little reasoning with a good deal of imagination is likely to rob the farmer of his hired man.

When employments are competitive, their wage rates must be competitive. Many an agricultural laborer can become the conductor or motorman of a street, suburban, or interurban electric car; he can find employment in numerous directions in the near-by town or city, or shop or factory. If the farm does not meet the competition of other employments, it must suffer the loss of some of its laborers. This in fact is what has happened in this country. The farm has lost laborers and has been unable to obtain laborers because it has not met the wages of competitive employments. The effort of the farm to meet the competition for its labor is often apparent within a rim of country surrounding cities of considerable size. In the nineteenth investigation of the wages of farm labor made by this Bureau, the farm wage rates of counties containing cities of more than 25,000 population are compared with wage rates in the rest of the state. The difference between the farm wages of such counties and the rest of the state is sometimes small and is often higher in such counties, but not everywhere so. In case of a lower wage rate in a county containing a city of 25,000 persons or more than in the rest of the state, it may be that the sort of labor required by the farms in such county is not of as high an order as that required by farms in the rest of the state.

262. GETTING THE IMMIGRANT ON THE LAND

a) THE EFFORTS OF THE BUREAU OF IMMIGRATION[1]

By T. V. POWDERLY

Up to the present time the laboring population of Europe has been in ignorance of the resources of the United States; today the principal information on which foreign workmen emigrate to the

[1] Adapted from *Report of the Chief of the Division of Information, Bureau of Immigration and Naturalization, Department of Commerce and Labor*, 1908, p. 275, and 1909, pp. 329–30.

United States comes from the large cities and mining and manufacturing centers of the Union. The popular impression among the workmen of Europe is that the United States is one of four things—a city street, the bed of a railroad, a factory, or a coal mine. That there are fertile acres in the United States on which men may settle and thrive is not generally known among the workmen of Europe, and as those previously admitted have contented themselves with working upon the streets, along railroads, in factories, or in mines, their correspondence with friends at home in the old country naturally induces others to come to these places. Under the direction and work of the Division of Information and Distribution of the Bureau of Immigration this condition of affairs must ultimately change, for every man directed to a congenial place on a farm, every man who becomes the possessor of a farm, every tenant, and everyone who shares the profits of a farm will become a missionary and in correspondence with friends in Europe will inform them that our resources do not consist solely of opportunities heretofore named, and in time the tide of immigration must turn away from the congested centers to the land.

This effort to divert the tide of immigration to agricultural sections of the country is of doubtful value unless conditions are favorable. Soil and climate should be suitable, the latter approximating to that of the home of the immigrant, the former not only fertile but adapted to crops like those the immigrant, if a farmer, was accustomed to raising at home. Likewise, so far as possible, those who do not speak English should be directed to localities where others of their race have settled. Intensive farming is better understood by alien land workers than any other, and for that reason many small farms with good transportation facilities and near-by markets are more attractive than large holdings. Among aliens, those coming from Northern Europe are preferred by perhaps a majority of applicants for farm labor. As the value of the Southern European as a fruit grower becomes known, the demand grows in volume.

The difficulty in securing labor at harvest time to gather in the crops on large farms, which has embarrassed the owners, or managers, and which was seriously acute the last two seasons, has given rise to a movement in favor of cutting up large farms into smaller holdings, each one capable of supporting a family in comfort and more likely to find a man desirous of owning and operating it himself than one who would prefer working on a large farm for another, or on shares.

That many owners of large holdings are considering the advisability of dividing their acreage into small farms is the information that comes to the division, and it regards this movement as in the right direction and calculated, if carried out, to result favorably to the settler—whether citizen or alien—as well as the country at large.

Such results as have accrued in the way of distribution are traceable to a genuine demand for laborers in the agricultural sections. Employers were not only ready to co-operate with the Division to the extent of submitting applications, but were willing in many instances to advance transportation. The Division is satisfied that, apart from ignorance of our language on the part of a large number of immigrants, and the want of transportation money, the principal drawback is the lack of understanding on the part of newcomers regarding our agricultural resources, methods of farming, and advantages to be derived away from the crowded cities. It was with a full realization of the need for distribution that Congress created the Division of Information, and its importance, now that prosperity will swell the tide of immigration, is augmented. Success in large measure can only come by slow growth and experience gained through persistent effort. All things considered, the Division has, so far, performed its work well. The good it has done outweighs the criticisms, many of them made in ignorance of facts, and the benefits conferred on employer and employee entitle it to consideration and support.

b) THE IMMIGRANT'S WELCOME[1]

By SAMUEL GOMPERS

In the South prevalent sentiment doubts the desirableness of the immigrants now arriving in America, though two or three of the states have taken up with "distribution." In Louisiana, the New Orleans press for the last few months has been giving much space to the new immigration station, the plans for which have been approved by the authorities at Washington. A Louisiana immigration and development league has been proposed, but it was announced by the *New Orleans States* that it would "probably not take shape until the Hamburg-American Steamship line definitely announced its purpose to come to New Orleans." To the *New York Observer*

[1] Adapted from "Schemes to Distribute Immigrants," Senate Document No. 21, 63d Cong., 1st sess., pp. 12-13. Reprinted from *American Federationist*, July, 1911.

the immigration at present to the Gulf States seems significant. In 1910 Tampa had 5,386 alien arrivals; Miami, 1,787; Key West, 2,457; Galveston, 4,996; and New Orleans, 3,604, with only a few hundreds in all at other ports.

In the other Southern States the "nation-wide patriotic and philanthropic movement for the distribution of immigration" is not being welcomed. Texas would have to repeal one of the provisions of its constitution before it could establish a state immigration bureau. The Missouri legislature in Feburary threw out the appropriation for the state board of immigration, and Kansas City, St. Louis, and other cities of the state will lose $25,000 advanced by them during the last two years for the support of the board. Georgia, through a convention of its Farmers' Union, which has 80,000 members, decided a few months ago that it wants no immigrants. In Mississippi the Farmers' Educational Co-operative Union passed resolutions in July, 1908, declaring its members "irrevocably opposed to the present tide of undesirable immigration now pouring into this country." North Carolina, through its bureau of labor, made a canvass of its possible need of immigrants and it found a strong opposition to the inducement or distribution of foreign cheap labor. South Carolina five years ago established a state bureau of immigration, appropriated considerable money to it, and, with a fund raised among cotton mill owners, real estate dealers, and others pecuniarily interested, its commissioners went abroad and brought two shiploads of immigrants from Belgium, and distributed them to the number of 762 to various places, but in two years few if any of these induced immigrants were to be found in the state. Consequently, March 4, 1909, a law was passed forbidding a state official "to attempt directly or indirectly to bring immigrants into the state of South Carolina." Virginia and North Carolina, which for a time had been taken in with South Carolina on the distribution scheme, after a brief experience suppressed their share in it by refusing to appropriate any more funds for the purpose.

The sentiments and views of the farmers, the small business men, and the wage workers of the South were thus expressed by T. J. Brooks, representing the Farmers' Educational and Co-operative Union before the Congressional Committee on Immigration and Naturalization, March 8, 1910:

> The only demand for foreign immigration throughout the agricultural districts of the South and West comes really from the transportation

interests, that wish to develop traffic; real estate boomers, hoping to sell land thereby; the large employers, always demanding cheap labor; and certain other financial and gambling interests, anxious to prevent the farmers from properly controlling the production and marketing of their crops sufficiently to secure a fair and reasonable price.

Speaking for Mississippi, the *Jackson Farmers' Union Advocate* has this:

If some good people from the northwestern part of the United States want to come down here, they will come, and we will welcome them if they take to us, our ideas about local matters such as the negro; but we do not favor a state movement to get them, nor the expenditure of state funds to attract them; because just as sure as that once gets started it will not only bring in some we don't want, but there will be a demand on the part of some to turn it to bringing in the foreign immigrant.

D. Nominal Wages and Real Wages

263. REAL WAGES OF THE FARM LABORER[1]

By GEORGE K. HOLMES

Rates of wages do not express the real wages often received by the farm laborer in this country. There were various extras apart from board. He may receive, without any money reckoning as to value, the use of dwelling and garden, stable for cow or horse; feed for cow, horse, swine, or poultry; pasture for cow, horse, or swine; butter, eggs, milk, fruit, vegetables for family use; firewood for his dwelling and the use of a team to haul it; the occasional use of a team for hauling for other purposes; the laborer may receive in addition to his rate of wages one meal a day, or laundry service, or occasional use of horse and buggy.

All of the various extras or allowances in addition to rates of wages are not made to the same laborer, nor is any one or more of these allowances made to every laborer, but the general fact is that these allowances as made in practice amount to a considerable addition to the money rate of wages.

The Commissioner of Labor of Michigan investigated this subject in 1895 and found that, of 4,412 farm laborers, 26.7 per cent received the use of dwelling in addition to money wages, 23.3 per cent received fuel, 19.9 per cent cow pasture, 24.5 per cent had the benefit of use

[1] Adapted from *Bulletin 99, Bureau of Statistics, United States Department of Agriculture*, pp. 49–53.

of team, and 28.4 per cent had a garden plot. The Michigan bureau determined that the average monthly value of such allowances was $6.22 per laborer.

From investigations made by this bureau it appears that the average monthly value of the dwelling, garden, and other appurtenances, the use of which was a part of the real wages paid without board, ranged from $1.75 to $5 in the United States, and the amount when wages were paid with board ranged from $1 to $4.50. The average value of feed for animals kept ranged from $1.11 to $3.11 per month; pasturage from 65 cents to $1.61; fire wood from $1.06 to $2.39; the occasional use of team for hauling was valued at 48 cents to $1.70, and the occasional use of horse and buggy, probably reaching as high a frequency as weekly use, ranged from 87 cents to $2.37.

The estimated value of the fruit given to the family of the laborer was reported to be worth from 80 cents to $1.64 per month; the value of the stabling for the laborer's horse, if he had one, was estimated to be 45 cents to $2 per month; and the laundry service for the laborer was reported by correspondents to range from 75 cents to $2 a month.

What all of the extras or allowances given to each laborer on the average were worth it was impossible to ascertain. The reports secured, however, are sufficient to indicate a considerable addition on this account to the money rate of wages.

Another element of real wages remaining to be considered is their purchasing power, and for this purpose Table 27 has been constructed to compare workingmen with farm laborers. It is entirely a table of index numbers. The purchasing power of the wages of workingmen is measured by the retail prices of food. The mean for the years 1890–1898 is represented by 100. For concise comparisons, the entire period of years has been divided into two periods and a mean for each of the two periods has been computed; the mean for the former one, 1890–1898, being, as stated, 100. The second period includes the years 1899–1907.

The index number for 1890–1898 being 100, the number representing the full-time weekly earnings for workingmen in the period 1899–1907 is 111.2. The index number for the latter period for the wage rate of the outdoor labor of men on farms per month in hiring by the year and season is 121; the rate per day for day labor on the farm in harvest work has the index number of 122.5; and the rate for day labor other than harvest work has the index number of 126.6.

TABLE 27

COMPARATIVE WAGES OF WORKINGMEN AND OF FARM LABORERS, AND COMPARATIVE RETAIL PRICES OF FOOD, TOTAL FOR THE UNITED STATES, 1890–1907

100.0 = mean for 1890–1898

YEAR	UNITED STATES BUREAU OF LABOR, INDEX NUMBER			WAGE RATE OF OUTDOOR LABOR OF MEN ON FARMS			PURCHASING POWER MEASURED BY RETAIL PRICES OF FOOD		
	Full-time Weekly Earnings for Workingmen	Retail Prices of Food Weighted according to Family Consumption	Purchasing Power Measured by Retail Prices of Food	Per Month in Hiring by the Year and Season	Per Day for Day Labor		Per Month in Hiring by the Year and Season	Per Day for Day Labor	
					Harvest Work	Other than Harvest Work		Harvest Work	Other than Harvest Work
1890	101.1	102.3	98.8	100.9	107.0	105.4	98.6	104.6	103.0
1891	100.9	103.7	97.3	102.4	107.0	105.4	98.7	103.2	101.6
1892	101.4	101.8	99.6	103.8	107.8	106.5	102.0	105.9	104.6
1893	101.3	104.3	97.1	103.6	100.8	100.0	99.3	96.6	95.9
1894	97.8	99.6	98.2	96.3	91.5	91.3	96.7	91.9	91.7
1895	98.5	97.7	100.8	97.2	92.2	92.4	99.5	94.4	94.6
1896	99.6	95.4	104.4	97.9	94.6	95.7	102.6	99.2	100.3
1897	99.3	96.2	103.2	98.7	97.7	98.9	102.6	101.6	102.8
1898	100.0	98.6	101.4	99.4	100.0	102.2	100.8	101.4	103.7
1899	101.3	99.4	101.9	103.6	104.7	107.6	104.2	105.3	108.2
1900	104.2	101.0	103.2	107.3	108.5	110.9	106.2	107.4	109.8
1901	106.0	105.1	100.9	111.1	113.2	115.2	105.7	107.7	109.6
1902	109.3	110.8	98.6	114.7	117.1	118.5	103.5	105.7	106.9
1903	112.4	110.2	102.0	120.0	121.7	123.9	108.9	110.4	112.4
1904	112.3	111.6	100.6	125.3	126.4	130.4	112.3	113.3	116.8
1905	114.1	112.3	101.6	130.5	131.8	137.0	116.2	117.4	122.0
1906	118.6	115.6	102.6	135.8	136.4	143.5	117.5	118.0	124.1
1907	122.5	120.5	101.7	141.1	141.1	150.0	117.1	117.1	124.5
Mean:									
1890–1898	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1899–1907	111.2	109.7	101.4	121.0	122.5	126.6	110.1	111.5	115.2

These comparisons establish the conclusion that the money wage rates of farm labor have increased during the eighteen years covered in a considerably greater degree than the wages of workingmen in non-agricultural occupations.

In the purchasing power of wages in terms of retail prices of food the workingmen barely gain from the first period to the second, the mean index number for the second period being 101.4. For the farm laborer the gain was from about 10 to 15 per cent, so that, notwithstanding the great rate of increase of retail prices of food, the rates of wages of farm labor increased in degrees sufficient to make as a net result a substantial rate of increase. The subject may be examined in detail by referring to Table 27.

264. THE FARM FURNISHES A LIVING IN ADDITION TO OTHER INCOME[1]

By W. C. FUNK

According to the Thirteenth Census, approximately 32 per cent of the population of the United States are actually living on farms. Most of these depend upon the farm for their livelihood. Some studies have already been made to determine the labor income of farmers in various sections, but this income is exclusive of what the farm furnishes in food, fuel, and house rent. The farm should be credited with the indirect income it furnishes to the farmer's family in products and in the privilege of the use of the house.

This indirect income from the farm is often underestimated by the farmer or merely taken for granted and its real value not appreciated. The person whose vocation demands that he live in the city has to pay a large proportion of his income for those things which the farmer receives without any cash outlay.

This bulletin considers the amount the farm should be credited with for that which it furnishes to the farmer's family in products and in the privilege of the use of the farmhouse. In the group of items studied, however, data are presented covering the amount purchased, as well as that furnished by the farm.

Studies were made in 10 localities, covering 3 cotton-growing, 2 corn-belt, 2 general-farming, and 3 typical dairy sections.

The average annual value of food, fuel, oil, and shelter per person for the families visited was $129.74, of which $91.97 was furnished

[1] Adapted from *Farmers' Bulletin 635*, pp. 1, 21.

directly by the farm and $37.77 purchased. The average value per family was $595.08, of which $421.17 was furnished by the farm and $173.91 purchased.

The average cost of the food consumed per person was $89.23. Of this food 63 per cent was furnished by the farm.

The quantity of fruit and vegetables used is in direct proportion to the quantity raised on the farm. It was also found that the grocery bill was reduced where increased quantities of fruit and vegetables were grown for home use.

The average annual value of the use of the farmhouse was found to be $125 per family. The value of the dwelling is generally considered a part of the value of the farm and is thus furnished free for the use of the farm family. The importance of this is fully appreciated by the family in the town or city paying house rent.

The average cost of board for each person, that is, the value of the food and its preparation, was $10 a month. The cost of board and lodging was $14.62. Of this sum, on the average only 22 per cent was paid out in actual cash by the farmer.

The result of these studies shows that the farmer's cost of living in actual cash expenditures is very materially reduced by what the farm furnishes in food products, fuel, and house rent; in fact, the income from this source adds as much to the real wealth of many farmers as does the net income from the sale of farm products.

If it were not for those products contributed by the farm without any actual cash expenditure, a great many farmers would not have a comfortable living. Extensive investigations relative to the profits in farming indicate that the average labor income of the farmer probably differs little from ordinary farm wages, but in addition to this, he has the products contributed by the farm, as discussed in this bulletin.

265. THE FARMER'S PURCHASING POWER[1]

By VICTOR H. OLMSTED

In my report of 1910 I showed that the value of 1 acre of the farmer's crops in 1909 was 72.7 per cent more than in 1899; that the cost of articles purchased by farmers had increased about 12.1 per

[1] Adapted from *Report of the Chief of the Bureau of Statistics, United States Department of Agriculture*, 1911 and 1912, and the *Agricultural Outlook*, December, 1914

cent; and, consequently, the purchasing power of the produce of 1 acre in 1909 was about 54 per cent greater than the purchasing power of the produce of 1 acre in 1899. This statement is in harmony with reports recently issued by the census relating to farm values; according to census reports land values have increased 109 per cent from 1900 to 1910.

The census of 1910 was taken at a time when farmers were in the zenith of their prosperity. For several years preceding crops were good and sold well. This is shown in the following table, which gives the average value per acre yearly since 1866 of 10 crops combined

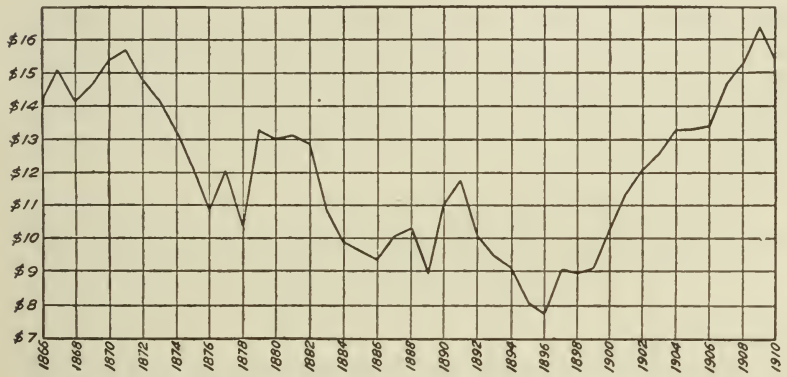


Chart showing value of the produce of 1 acre (wheat, corn, oats, barley, rye, buckwheat, potatoes, tobacco, hay, and cotton) combined, for 95 per cent of area of full crops.

(wheat, corn, oats, barley, rye, buckwheat, potatoes, hay, cotton, tobacco); they include about 95 per cent of the total crop area of the United States, and closely approximate the average value of all crops.

YEARLY VALUE PER ACRE OF 10 CROPS COMBINED

1910	$15.49	1898	$9.00	1886	$9.41	1874	$13.25
1909	16.42	1897	9.07	1885	9.72	1873	14.19
1908	15.32	1896	7.94	1884	9.95	1872	14.86
1907	14.74	1895	8.12	1883	10.93	1871	15.74
1906	13.46	1894	9.06	1882	12.93	1870	15.40
1905	13.28	1893	9.50	1881	13.10	1869	14.67
1904	13.26	1892	10.10	1880	13.01	1868	14.17
1903	12.62	1891	11.76	1879	13.26	1867	15.09
1902	12.07	1890	11.03	1878	10.37	1866	14.17
1901	11.43	1889	8.99	1877	12.01		
1900	10.31	1888	10.30	1876	10.80		
1899	9.13	1887	10.14	1875	12.20		

The table shows that from the year of greatest depression, 1896, to 1909, there was a practically constant yearly increase in value of the output of an acre of produce, the total increase from $7.94 to $16.42 being nearly 107 per cent. In 1910 there was the first reduction from the preceding year since 1898—a reduction from $16.42 per acre to $15.49, equivalent to 5.7 per cent; however, values per acre in 1910 were 69.7 per cent higher than in the census year of 1899.

Although the aggregate production of crops in 1911 was about 6.3 per cent smaller than 1910 and 0.5 per cent smaller than in 1909, the total money value of crop production in 1911, by reason of enhancement in prices, was about 2.1 per cent greater than in 1910 and 3 per cent greater than 1909. According to a report of the Bureau of the Census, the value of all crops in the United States in 1909 was about $5,487,000,000; on this basis it is estimated that the money value of all crops in 1910 was about $5,537,000,000, and of crops in 1911, $5,654,000,000.

The money value of 1 acre of produce in 1911 averaged about $15.48, as compared with $15.50 in 1910, $15.99 in 1909, and $9.48 in 1899. The larger aggregate value of crops in 1911 than in 1910 and 1909 was due to increased acreage in conjunction with enhancement of prices.

The estimates here given are based upon data received for crops covering about 90 per cent of the area of all field crops and may be assumed to be representative of all crops.

An investigation of prices of about 85 articles generally purchased by farmers indicates that such articles averaged in price in 1911 about 1.1 per cent higher than in 1910, 2.6 per cent higher than in 1909, and about 15.3 per cent higher than in 1899.

Taking into consideration the variation in the price of things which farmers buy and in the things which farmers sell, it appears that the purchasing power of 1 acre of crops in 1911 was 1.2 per cent less than in 1910, 5.7 per cent less than in 1909, and 41.6 per cent greater than in 1899.

The purchasing power of 1 acre of corn in 1911 was 9 per cent greater than in 1910, 4.1 per cent less than in 1909, and 50.7 per cent greater than in 1899.

The purchasing power of 1 acre of wheat in 1911 was 11.7 per cent less than in 1910, 29.8 per cent less than in 1909, and 30.2 per cent greater than in 1899.

The purchasing power of 1 acre of cotton in 1911 (excluding value of the seed) was 20.6 per cent less than in 1910, 10.2 per cent less than in 1909, and 32.3 per cent more than in 1899.

Upon the basis of the purchasing power of the value of 1 acre of produce, the year 1909 stands as the most prosperous of recent years and, apparently, the most prosperous for farmers of the past fifty years for which there are records.

In 1913 the value of 1 acre of the farmer's crops averaged about 1.2 per cent higher than in 1909, whereas the value of articles bought by the farmer had advanced in the same time 5.7 per cent; consequently as a result of the greater increase in the price of what the farmer buys than what he sells, the actual purchasing power of 1 acre of the farmer's produce was about 4.3 per cent less than in 1909. There was a material increase in the purchasing power of farmers from 1896 to 1909, but since 1909 there has been a check to this rapid increase, with some reaction downward.

E. Data from American Farms

266. WAGE RATES OF AMERICAN FARM LABOR[1]

By GEORGE K. HOLMES

Nineteen times this Bureau has investigated the wage rates of the labor of men on farms throughout the United States, beginning with 1866 and ending with 1909, a period of forty-four years. These investigations have all ascertained wage rates, not only for all the states in existence at the time, but also for the nation as a whole. The aim has been to learn the customary rates of farm wages in every neighborhood in the United States and to combine these rates arithmetically, so as to make general averages for the several states, for the geographic divisions of states, and for the United States.

Monthly rates of wages for outdoor labor at four of these dates is shown in Table 13.

Turning now to the rates of wages which were paid for day labor in harvest work and for labor other than harvest work, without and with board, the following statement can be made for the four classes of wage rates per day for the 19 investigations:

For day labor in harvest work, with board, the rate per day in 1866 was $1.04, and the amount rose to $1.18 in 1874 or 1875. A decline

[1] Adapted from *Bulletin 99, Bureau of Statistics, United States Department of Agriculture*, pp. 7, 31, 35, 37–39, 49.

TABLE 13

AVERAGE WAGE RATES OF OUTDOOR LABOR OF MEN ON FARMS, PER MONTH IN HIRING BY THE SEASON, WITHOUT AND WITH BOARD, BY STATES AND GEOGRAPHIC DIVISIONS, 4 INVESTIGATIONS IN 1866, 1869, 1875, AND 1909

[Currency years 1866 to 1875 in gold]

STATE AND GEOGRAPHIC DIVISION	Without Board				With Board			
	1866	1869	1874 or 1875	1909	1866	1869	1874 or 1875	1909
Maine	$22.36	$22.76	$25.39	$38.44	$16.24	$15.74	$17.83	$27.60
New Hampshire	27.54	29.24	30.14	38.92	20.01	21.39	20.38	26.33
Vermont	26.36	28.63	28.37	37.44	18.11	20.03	19.03	26 86
Massachusetts	29.29	30.10	33.39	44.17	19.59	20.37	20.16	29.30
Rhode Island	28.16	27.90	30.36	46.17	18.54	18.72	19.51	26.38
Connecticut	27.92	28.27	31.22	38.67	19.92	18.72	20.16	26.39
New York	24.56	25.18	27.24	35.00	17.08	16.92	18.63	26.00
New Jersey	23.32	25.24	32.74	33.69	16.74	16.50	17.67	22.06
Pennsylvania	24.01	24.23	26.02	30.57	16.10	16.31	16.05	20.72
Delaware	18.48	18.36	21.25	26.32	10.74	12.85	13.30	17.36
Maryland	16.78	18.14	19.31	24.56	10.97	11.23	11.68	16.81
Virginia	12.12	13.09	14.15	22.25	8.51	9.21	9.71	16.01
West Virginia	20.66	18.96	20.29	28.75	14.92	12.94	13.98	21.01
North Carolina	10.69	11.00	13.16	20.21	7.04	7.38	9.25	14.69
South Carolina	9.86	9.89	12.64	16.36	6.66	7.20	9.11	12.66
Georgia	12.99	12.97	14.28	18.91	8.50	9.36	10.12	13.72
Florida	14.47	15.60	16.91	27.20	10.18	10.28	9.19	18.49
Ohio	22.84	23.33	22.96	29.58	16.30	15.95	16.87	22.11
Indiana	22.18	22.37	24.67	28.77	15.84	15.28	16.91	22.15
Illinois	23.30	22.79	24.89	31.77	16.40	15.62	16.87	25.09
Michigan	24.60	24.97	27.84	33.92	17.00	17.88	19.08	25.10
Wisconsin	25.10	24.96	25.47	38.22	17.32	16.76	17.39	28.57
Minnesota	27.03	25.58	26.58	39.79	19.13	17.28	18.04	29.25
Iowa	23.40	24.70	24.07	36.77	16.77	16.48	16.91	28.93
Missouri	21.71	21.84	19.84	28.23	15.25	15.65	14.16	21.10
North Dakota	22.53		32.38	46.93	15.49		21.25	33.34
South Dakota				41.52				31.46
Nebraska	32.68	28.14	24.50	38.65	22.08	18.87	15.92	28.28
Kansas	25.63	24.57	22.38	35.34	17.92	16.70	14.87	25.83
Kentucky	16.76	15.67	18.48	23.31	12.01	10.93	12.88	18.00
Tennessee	15.49	14.33	15.96	21.02	11.69	10.24	10.87	15.70
Alabama	11.53	12.90	14.53	19.29	7.74	9.32	10.45	13.78
Mississippi	15.90	14.74	16.48	20.37	11.83	12.38	11.71	14.82
Louisiana	15.66	19.88	16.26	19.93	12.91	13.55	10.87	14.37
Texas	16.71	15.54	20.10	25.77	11.80	12.46	14.37	19.07
Oklahoma				29.05				21.42
Arkansas	20.85	19.93	20.21	23.25	13.70	13.70	15.61	16.82
Montana			49.00	55.08			35.56	39.29
Wyoming			52.47	44.75			38.81	35.60
Colorado	79.16		36.31	46.61	50.00		21.37	32.57
New Mexico	30.00		20.60	34.68	25.00		13.01	26.11
Arizona				49.01				36.10
Utah	58.22		37.29	57.00	38.41		28.62	41.36
Nevada	85.00			56.23	70.00			40.83
Idaho				52.64				40.45
Washington	60.50		36.13	49.25	44.50		28.19	36.39
Oregon	41.60		34.91	44.81	29.00		25.33	34.03
California	50.00	41.91	45.27	47.79	34.39	26.62	31.22	34.93
Geographic division:								
North Atlantic	25.19	25.96	28.31	35.11	17.45	17.58	18.25	24.56
South Atlantic	12.41	12.70	14.42	20.86	8.33	8.86	9.94	15.13
North Central	23.39	23.49	24.07	33.64	16.50	16.15	16.75	25.42
South Central	15.25	15.32	16.92	22.48	11.09	11.32	11.98	16.57
Western	47.06	41.91	40.68	48.04	33.05	26.62	29.10	35.32
United States	18.08	18.06	19.60	28.22	12.69	12.65	13.53	20.80

followed, and it was not until 1881 or 1882 that the amount rose above the previous highest figure and reached $1.20 per day. Again there

was a decline, which lasted until 1899, during which period the rate declined as low as 96 cents in 1895. The rate for 1902 was $1.23; for 1906, $1.45; and for 1909, $1.43.

The geographic divisions of states take their customary order in the rates of day wages for day labor in harvest work. The rate in 1909 in the Western States was $2.02; in North Central, $1.87; in the North Atlantic, $1.62; in the South Central, $1.10; and in the South Atlantic, $1.03.

For day labor other than harvest work, with board, the rate in 1866 was 64 cents in the United States. It reached 68 cents in 1874 or 1875, and declined during the industrial depression of the seventies, so that the subsequent increase reached 70 cents in 1881 or 1882. From that year to 1898 the rate of day wages for labor other than harvest work, with board, remained about stationary, except for the depression of the nineties. In 1898 the rate was 71 cents; in 1899, 75 cents; 1902, 83 cents; in 1906, $1.03; and in 1909, the same amount, $1.03.

There is still the same arrangement of geographic divisions as before, in 1909, in order of amount of rate of wages paid for labor other than harvest work, with board.

TABLE 17

AVERAGE WAGE RATES OF OUTDOOR LABOR OF MEN ON FARMS, PER DAY FOR DAY LABOR IN HARVEST WORK, WITH AND WITHOUT BOARD, BY GEOGRAPHIC DIVISIONS, 9 INVESTIGATIONS FROM 1891 TO 1909

WITHOUT BOARD

State and Geographic Division	1891 or 1892	1893	1894	1895	1898	1899	1902	1906	1909
Geographic division:									
North Atlantic	1.72	1.68	1.57	1.56	1.60	1.66	1.82	2.07	1.98
South Atlantic	1.08	1.00	.95	.94	.97	.99	1.08	1.31	1.25
North Central	1.67	1.55	1.38	1.41	1 53	1.66	1.89	2.17	2.21
South Central	1.12	1.01	.91	.95	1.07	1.09	1.21	1.45	1.34
Western	2 04	1.86	1.67	1.60	1.80	1.91	2.12	2.30	2.51
United States	1.39	1.30	1.18	1.19	1.29	1.35	1.51	1.76	1.71

WITH BOARD

Geographic division:									
North Atlantic	1.33	1.36	1.26	1.25	1.28	1.33	1.45	1.69	1.62
South Atlantic	.85	.83	.78	.76	.80	.82	.89	1.08	1.03
North Central	1.32	1.28	1.13	1.15	1.24	1.37	1.57	1.80	1.87
South Central	.86	.84	.76	.76	.86	.89	.97	1.18	1.10
Western	1.56	1.48	1.30	1.24	1.44	1.56	1.75	1.97	2.02
United States	1.09	1.07	.97	.96	1.04	1.10	1.23	1.45	1.43

The general trend of farm wages during this period of forty-four years is shown graphically in the following diagram:

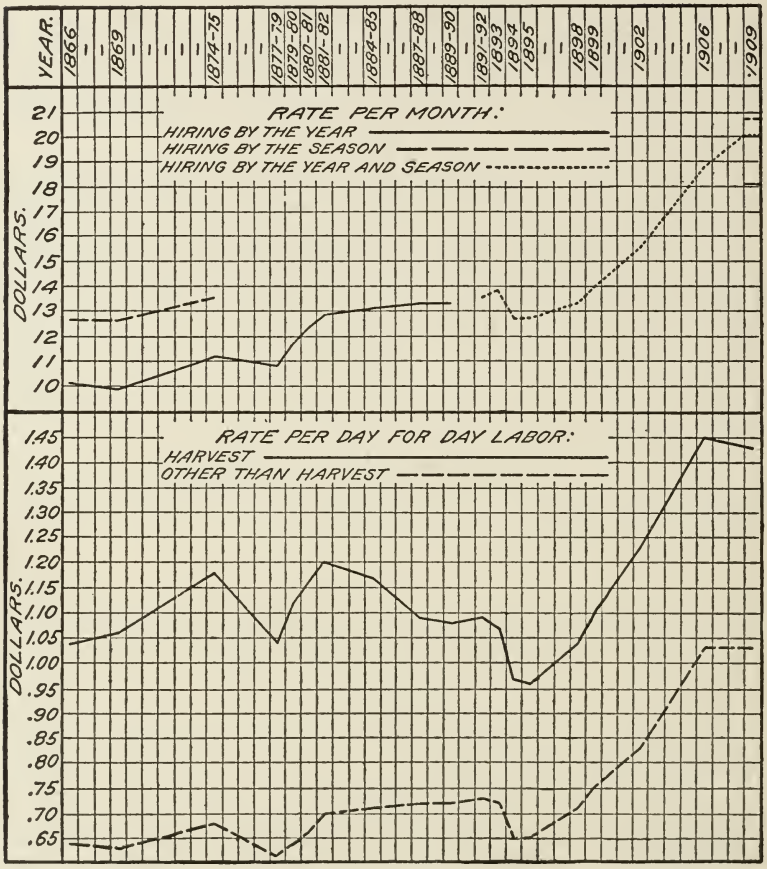


FIG. 1.—Diagram showing average wage rates of outdoor labor of men on farms, with board, in the United States.

NOTE.—The *Agricultural Outlook* of March 20, 1915, has the following to say concerning the later wage situation.—EDITOR.

The money wages of farm labor averaged during the past year about 1.7 per cent lower than during the preceding year, but about 9 per cent higher than five years ago.

The wages per month without board averaged, for the United States, $29.88 during the past year, which compares with $30.31 in

the preceding year, $27.43 five years ago, and $19.97 fifteen years ago. State averages last year ranged from $16.50 in South Carolina to $56 in Nevada.

Wages per month, including board, averaged $21.05, compared with $21.38 in the preceding year, $20.01 five years ago, and $13.90 fifteen years ago. State averages last year ranged from $12 in South Carolina to $39 in Nevada.

Day labor other than harvest, without board, averaged $1.45 a day, compared with $1.50 the preceding year and $1.29 five years ago. State averages ranged from $0.82 in South Carolina to $2.54 in Montana.

Day labor other than harvest, with board, averaged $1.13, compared with $1.16 a year ago and $1.03 five years ago. State averages ranged from $0.64 in South Carolina to $1.80 in Montana.

Day labor at harvest time, without board, averaged $1.91, compared with $1.94 a year ago and $1.71 five years ago. State averages ranged from $1.06 in Mississippi to $3.25 in North Dakota.

Day labor at harvest time, with board, averaged $1.55, compared with $1.57 a year ago and $1.43 five years ago. State averages ranged from $0.82 in Mississippi to $2.68 in North Dakota.

The reductions in wages as compared with the preceding year were greatest in the Southern States, due largely to the depression in the cotton market; but all sections showed some reduction, although a few states showed slight advances in some kinds of employment.

267. THE FARMER'S INCOME[1]

By E. A. GOLDENWEISER

According to figures secured for the Thirteenth Census, for the year 1909, the average value of crops per farm was $511 and of livestock products $177 per farm. In addition to these sources of income, animals sold and animals slaughtered on the farm show an average value of $288 per farm, and the value of house rent and of food and fuel consumed by the family but not reported in the census is estimated at $260.

The total earnings of farms and farm families arrived at in this way were thus about $1,236 per farm. The farm expenses, for labor, fertilizer, feed, seed, threshing, animals purchased, taxes, and miscellaneous items averaged $432 and a maintenance charge of 5 per cent

[1] Adapted from the *American Economic Review*, VI (March, 1916), 42–48.

on the value of buildings, and of 15 per cent on the value of implements and machinery brings the total expenditures per farm to an average of $592. Deducting this from total farm income leaves $724 available for family expenses, for payments on indebtedness, and for savings. This amount includes the interest on investments, which at 5 per cent is $322, leaving $402 as the earnings of the average farm family.

One way of analyzing the farmer's income is to distinguish between the interest on his investment, the wages earned by his own labor and superintendence, the value of the unpaid labor of his family, and the profits of his enterprise. No information is available for apportioning the income between these elements, except that about $322 represents interest, and $402 includes all the other items.

In addition to the direct earnings of farmers derived from the value of farm products, the item of increase in the value of their property must be considered. The only way of estimating this increase is by subtracting from the total value of farm property in 1910 that for 1900 and dividing the difference by ten. This calculation gives an average annual increase in the value of farm property of $2,055,000,000, or $323 per farm, of which about $242 was the increase in the value of land, $44 in the value of buildings, $8 in the value of implements and machinery, and $29 in the value of live-stock. A part of this increase in value is the direct result of the farmer's labor in improving his farm, while another part is the farmer's share in the increase of the nation's wealth. Owing to the fact that the census of 1900 was taken in June and that of 1910 in April, the increase in the value of live-stock is an understatement. The increase in the value of farm property, in so far as it is real, represents a capitalization of the increase in the value of farm products, and the farmer receives interest on the increase in the shape of greater returns on his crops. It is probably true, however, that a certain amount of the increase in the value of the land represents an overvaluation by its owners, which may never be realized by them. Even if it is a genuine value for 1910, the farmer may not reap the benefit of that value unless he sells his farm, for the price of land may decline. Thus the farmer's prosperity, like that of any other independent business man, is dependent on a large number of factors over many of which he has no control. The amount of products for a given year depends in part upon the farmer's industry and foresight and in part on weather conditions; the price received for products sold is very largely deter-

mined by conditions in the world market and is in large measure beyond the influence of the farmer. The increase in the value of his land and other property reflects the income that he received from his products during previous years, and is influenced by the growth of population, the extension of transportation facilities, and many other factors.

The limitations of these figures on farmers' earnings should be clearly understood. In the first place they are average figures for the United States as a whole, covering decidedly varied conditions in different parts of the country. Figures for individual localities would be more illuminating, but detailed information for regions is not available. It is probably true also that in the figures for the United States as a whole the errors are more likely to balance each other than they would be in figures for smaller areas. Considerably more significant than averages would be figures giving the number of farmers in each income group, but such figures do not exist. It should also be mentioned that no attempt is here made to draw a distinction between the income of farmers cultivating their own land and the income of tenant farmers who have to depend almost entirely on what the family earns by its labor. Another limitation of the figures is that they apply only to the single year 1909; however, this was a fairly representative year. Still further, the census definition of a farm includes small farms in the neighborhood of large cities, whose owners derive their principal revenue from other pursuits than agriculture. However, no farms under 3 acres are included in the census enumeration unless they produced $250 worth of crops or gave full-time employment to at least one man.

Finally, in stating that the average farm family earned $402 in 1909, it should be kept in mind that the cost of living on the farm is very low as compared with that in the cities. The farm family produced and consumed food valued on the farm at $261; in the city this same food would cost at least $100 additional, the item for rent, considering accommodations, would be higher than $125 in the city, and fuel would cost more than $35. The $400 earned by the farm family would thus probably correspond to an income of $600 or more received by an industrial worker in the city, and two-thirds of the farmers have, in addition, the interest earned by their investment. Furthermore, while the farming group is not entirely or even nearly homogeneous, it is nevertheless true that the extremes of wealth and poverty are not represented in it, and that the average is not

composed of as widely divergent elements as would be a similar average for an industrial group.

It might be said that the earnings of farm families as here given do not materially exceed the earnings of one adult farm laborer at the rate of $30 a month and board. The figures do not, indeed, speak of large wealth and do not seem to offer brilliant opportunities for young men seeking a short road to affluence; nevertheless, it is probably true that the farming population of the United States, consisting as it does of more than 30 million people, has a larger average income per family than any other equally homogeneous group of individuals of anything like the same size anywhere in the world.

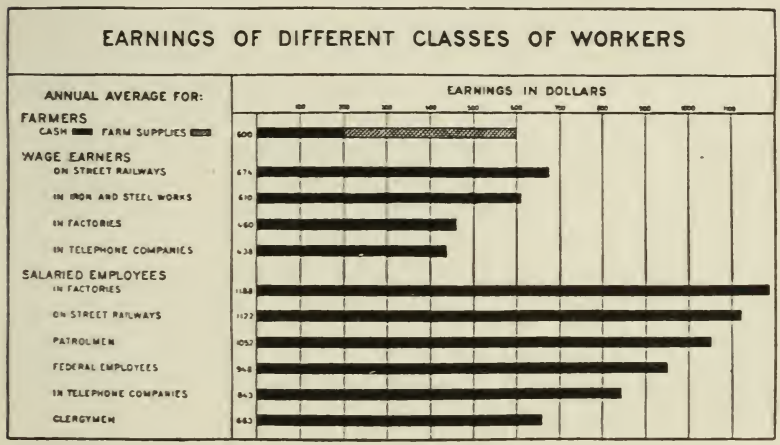
NOTE.—The same writer has carried this study somewhat farther in *Farmers' Bulletin 746*, in which he makes comparisons between the incomes of farmers and other classes of workers. After deriving the figure $402 as above, he points out that this average

is affected by the financial losses sustained by the estates of wealthy persons who farm for amusement, by the small farm incomes from suburban farms whose owners earn their living by occupations other than farming, and by the low wages of small tenant farmers in the South, where tenantry in many cases is simply a method of hiring labor. Furthermore, the $402 include no earnings derived from pursuits other than farming, an item that is important in certain regions in which even genuine farmers often engage in lumbering or other outside work in addition to their work on the farms. There is no doubt, therefore, but that this figure is lower than the true average income of typical farmers throughout the country.

The office of Farm Management has made intensive studies of 4,018 farms in widely scattered sections of the United States. In each region selected all the farms were investigated, but the regions themselves generally represent better than average conditions. The average earnings of these farms were $952, of which about $400 represented the value of the house rent and of food and fuel supplied by the farm, and about $550 the cash income of the farm family. The two figures may be considered as the extremes between which the true average lies. It is significant that the averages obtained by actual investigations of 25,000 families of wage earners made by the Bureau of Labor in 1902 shows an average income of $750 per family, and a study of 16,000 industrial families made by the Immigration Commission in 1909 shows an average of $721 per family. While the farm families of the United States thus seem to be making about the same amount as the industrial families,

their financial position is rendered more advantageous by reason (1) of the lower cost of living in the country, (2) the interest yielded by the farm investment, and (3) possible gains from the increase in value of farm property.

Allowing for the unpaid labor of members of the farmer's family, and assuming that the representative farmer would secure a labor return half-way between the two extremes mentioned above, the average wages of the American farmer would be about $200 in cash



and $400 in things supplied by the farm—$600, as compared with $460, for the average factory worker and $1,200 for the average salaried employe. These comparisons are shown graphically in the accompanying diagram.—EDITOR.

XVI

SOME PROBLEMS OF AGRICULTURAL LABOR

Introduction

We are prone to think of "labor problems" as confined to urban employments, and to assume that rural labor is performed under safe, healthful, and otherwise satisfactory conditions. This was perhaps measurably the case in the agricultural experience of the generation that is passing. Farming was almost exclusively a family enterprise and labor was employed under home conditions. The pioneer wife, to be sure, might be grossly overworked, both in the farm kitchen and in the harvest field, and growing boys were doubtless often set at tasks beyond their strength. Poor housing and diet were abuses that existed then as now (see selections 29 and 30), and hard drinking is no new evil in country districts (selection 272).

But, on the other hand, the coming of machine processes and capitalistic methods has raised some problems of agricultural laborers which were little, if at all, known in the older day. Machine appliances make certain of the better sorts of labor vastly more efficient than they could be under hand methods, but it also creates new possibilities of injury and possible death. The use of machinery enables the farm manager to dispense with hand workers in many processes, but it likewise brings about a demand for certain classes of skilled labor of which there seems never to be an adequate supply. The sheer "ignorance and brute strength" which constituted an adequate equipment for subduing the wilderness fails to get results from complicated farm machinery or highly bred dairy cows.

The passing to more specialized and intensive types of culture creates strong seasonal demands for labor of inferior grades in the routine processes which cannot be taken over by machines. With this come irregularity of employment, itinerant labor, exploitation of workers by employment agencies and labor bosses, and most if not all of the abuses with which we have become familiar in connection with the use of low-grade labor in industrial employments.

Finally, the emergence of a separate class of laborers in agriculture has already given rise to class consciousness and organization for the attainment of class ends. Selection 264 turns our eyes to France to

show us that what is new and sporadic in America has become the established order in older agricultural communities. England has seriously considered the issue of minimum wage legislation for farm laborers. Since it is evident that the future trend of our development will be toward more industrialized conditions in agriculture rather than less, it behooves us to recognize these problems early, investigate them carefully, and attempt to take preventive measures now rather than wait for a day of drastic remedies.

A. Hours and Conditions of Labor

268. THE LONG DAY[1]

By CARL W. THOMPSON and G. P. WARBER

Even the best farm manager of today finds that there are certain seasons of the year when work has to be rushed. Even today at harvest time the best of farmers are obliged to put in longer hours per day. A field of early oats ripens at the same time that barley is dead ripe, and the farmer dares not put off until tomorrow what can be done today.

Some years a late spring or a prolonged rainy season will put the best farm manager away behind with his work. So it was in the southeastern part of the state in the spring of 1912. Many farmers could not begin to seed until a month later than the usual time. In order to get any crop at all in such cases it is necessary to keep horses and labor going as long as they can stand it. In this way a man with ample help for ordinary seasons may be obliged to rush work all summer long, for the growing season is limited. Thus, when a field of new-mown hay is nicely cured, an impending storm necessitates keeping on hauling until darkness stops the field work for the day. It is not uncommon for town people, returning from an evening's automobile spin in the country, to see lights in barns at ten o'clock at night. If they were to stop to listen, they might hear the hum of the cream separator, the goodnight refrain for the sweat-drenched, fatigued lad, who is turning the machine as the last job of the day.

True it is that such late hours are no longer the rule. The average working day is about ten hours in the field. But, as already alluded to, there are several hours required for chores. The thrifty, well-to-do farmer rises at four-thirty or four-forty-five in the morning during the season of field work. The chores are done by six or six-thirty, depending upon the number of cows, and the number of hands to

[1] Adapted from "Social and Economic Survey of a Rural Township in Southern Minnesota," *University of Minnesota Studies in Economics*, No. 1, 9–10.

milk them. Breakfast is a matter of only fifteen minutes or so, and by seven o'clock every good farmer has to be starting his field work. Most farmers want their dinner regularly at twelve o'clock. The housewife must have the meal ready at that time, though occasionally she will be kept waiting until one o'clock or after before the men feel that they can drop the job on hand and take time to eat. One hour's time is ordinarily allowed for dinner. This noon hour may include ten or fifteen minutes for scanning the daily paper, but there is no time for recreation. First, the horses must be fed and then the men wash up and sit down for their own meal. At one o'clock, or as soon after as possible, "it's get out the horses and back into the field again." The afternoon's work drags on until six o'clock, which is the approved quitting time. As we have seen, however, the chores remain to be done after supper is over. By eight, or eight-thirty ordinarily, most farmers are through with the day's work.

We have not yet considered the routine of tasks for the winter months. Naturally the hours of work are shorter. The keeping of high-grade dairy cattle requires regular hours, however, and the best dairymen milk their cows at the same hour in the morning and evening the year around. This necessitates a five o'clock rising hour for the winter also. Even though the work is not so toilsome during the winter months as it is in the hot, sultry weather of June or July when the hay has to be mowed away, or the barley threshed, the milk has to be taken to town every morning no matter how cold it is, and the whole day long a man is kept "puttering around" the yard doing chores. The work is finished earlier in the evening than it is in the summer, but the care of high-priced live stock prevents participation in social gatherings as of yore. "Under big-scale ranch-farming conditions, it used to be all right to trust to luck in April and see how many lambs you could count gamboling on the meadows green in May; but a man on a present-day farm, raising pure-bred horses, cattle, and hogs, has to pass many sleepless nights in tending the dams, or his year's business will represent a loss."

269. A TEN-HOUR DAY[1]

By GEORGE T. POWELL

Thirty years ago, late of an evening, while sitting upon the porch of my home, I heard the sound of welts and blows that were being delivered with a stick upon the backs of the cows of a near neighbor.

[1] Adapted from *The World's Work*, XXVII, No. 2 (December, 1913), 232–35.

The hired man, after a day of toil, by the dim light of a lantern was milking several cows, and in ill temper over it, when he should have been at his home having needed rest and relaxation. With every blow that was knocking all possible profits out of my neighbor's cows, I was convincingly impressed that the system of farm labor was upon a wrong and uneconomic basis. Though other industries had adjusted their labor to shorter hours with a gradual increase in wages, farming was being conducted on the old line of long hours, and so was steadily driving the best class of labor from that industry.

Soon after this stable incident, the men working at my Orchard Farm were informed that a change in working hours had been decided upon, and that, thereafter, they would be required to work only ten hours a day, but that I should expect that all necessary work would be accomplished in the shorter time. The announcement was a surprise to the men and it gave them a new understanding of farm work. They at once put new activity, energy, and interest into their work. A standard of greater efficiency was established.

At the time of engaging men for the next year, applicants for work under the new system were numerous, and among them was the man who beat the cows. He was accepted and proved to be an intelligent and faithful worker; and he remained on the farm for twenty-four years.

With the shorter hours of labor, with good schools and churches within a short distance of the farm, with time and opportunity for cultivating a few flowers about the home and reading the agricultural papers and books that were supplied by the farm and by a well-equipped school library, these families had no desire to give up farm labor and to leave their farm homes for homes in the city where no such privileges or comforts were possible.

270. ATTRACTING AND HOLDING THE RIGHT KIND OF FARM HELP[1]

There is no hired help problem at Ravenswood, the 2,200-acre farm of C. E. Leonard and Son, in central Missouri. Good tenant houses, a community center, and all-the-year-round employment have made possible the solution of this problem. This estate has been in the Leonard family for almost a century, and the question of a sufficient farm force made up of efficient and trustworthy workers has been

[1] Adapted from "Solving the Problem of Farm Labor," *The World's Work*, XXVII (December, 1913), 230–35.

studied for a good many years. The satisfactory labor conditions that are today noticeable to every visitor at Ravenswood are the results of an evolution.

One rule is that every man is to be paid what he earns and must earn what he is paid. But in addition to this the owners have shown a broad sympathy for the employes. The satisfaction of the men has been sought. They, in turn, feel a pride in the place. Comfortable homes, beautiful surroundings, a real rural graded school, a neighborhood church, good roads, telephones, rural free delivery mail service, and an out-in-the-country community center—all these are for the men and their families to enjoy. The tenant houses at Ravenswood differ widely from the type found on too many farms. They are attractive in appearance, conveniently arranged, of pleasing architecture, and no two houses quite alike. The "our home" idea is carefully cultivated. Some of the tenant houses are of brick and have slate roofs; others are of frame with asbestos shingle roofs. All houses have cement porches. The cost of these buildings varies from $1,050 to $2,200.

On a five-acre tract of land on the corner of the farm adjoining the little hamlet of not more than a dozen homes is the rural school, a two-story brick building with large basement and adequate heating plant. The cost of this modern schoolhouse, built last year to replace an old-time structure of the box-car kind, was $3,800. Of this amount the Messrs. Leonard gave $1,000. They also donated the land, with the understanding that work in agriculture is to be carried on and that crop and soil experiments are to be conducted from year to year. Liberal as they have apparently been, they frankly say that what they have done has not been done unselfishly. The right kind of people, they reason, will wish their children to have school advantages, so the only way to keep these people on the place is to see that the school is provided.

Just across the road from the schoolhouse is the church where on Sundays the tenants on the Leonard farm may go and feel welcome as they meet with other farmers and their families. Because the need of church advantages is recognized, just as is the necessity of educational opportunities, Ravenswood gave largely to the funds to build this church a number of years ago, and has since liberally supported it.

The proprietors of this big country place believe in neighborhood betterment and have tried to make the environment conducive to a clean and healthful childhood. Furthermore, they hold it to be true

that the man who has worries at home is likely to be less efficient in his work—and the standard of efficiency is kept up on this farm. Every man is treated with consideration; no abusive language toward the men is allowed. Merit is recognized. Hands who work in the fields are not required to do the chores after a hard day's work. Men whose services prove satisfactory are assured of employment throughout the year. And every employe is paid promptly. Christmas is observed in old-fashioned style every year. Every man, woman, and child is invited to "the big house" and everybody gets a present off the Christmas tree. Kindness is a consideration in keeping help on this farm.

Somewhat similar is the experience of a prominent grape grower of Fresno County, California. He learned that one of the fixed habits of the Japanese was to take a hot bath as often as they could get one. He concluded that a little deference to the habits of the men would be worth what it cost. He installed a big sheet-iron tank and water-heating device. Every day, at noon and at evening, the delighted Japanese splashed about in the hot bath that they loved, and grape pickers were easily secured when the neighbors could not get them at any price.

Then the idea was carried on to the treatment of the permanent white laborers. The "bunk-house" of the majority of western ranches is a rude, unpainted "shack," thrown together on the theory that any covering from the wet is enough for the "blanket stiffs" who bring their own bedding on their backs and who have known too often the necessity of sleeping in the open or under a friendly haystack to disdain something even a little better. But Mr. Tarpey felt that more than this was needed to give the men the comfort that would persuade them to give their best efforts and their personal interest to his work. So he built a neat, two-story frame house with a separate room for every man. Instead of the straw-lined bunks there were plain iron beds and mattresses. There was a bathroom with the simplest kind of shower attachment but with hot and cold water. And one large room downstairs was fitted with writing and card tables, some books and magazines, plenty of light to read by, and a good stove. Here the men could spend the evening in cheerful social pleasures instead of in the dismal, lantern-lit, and cold discomfort of a bunk-house.

That investment, also, has paid well. It has enabled the employer to attract and hold the sober and self-respecting and industrious men

of the white laboring population. Men of that sort pay for the extra cost of their care by exceptional initiative and by unusual devotion to their employer's interests.

271. SOLVING LABOR TROUBLE IN CALIFORNIA[1]

There occurred on August 3, 1913, on the Durst hop ranch near Wheatland, Yuba County, a riot among the hop pickers employed on the ranch, resulting in the killing of two police officials and two pickers. It was the claim of the pickers that one of the primary causes of the discontent in their ranks, leading to riot and bloodshed, was the insanitary condition of the camp in which they were segregated on the ranch Brief investigations and reports of state officials had partially substantiated these claims. Before the trial of Richard Ford and Herman Suhr, charged with having caused the murder of one of the state officials by inciting the crowd of pickers to riot, was begun, it was announced that evidence concerning the sanitary and living conditions in the camp would be introduced. Consequently the Commission of Immigration and Housing decided to avail itself of this opportunity to conduct a careful investigation into the economic and social causes leading up to the riot. The results of this investigation are here merely summarized.

In previous years there had often been a lack of pickers when the hops were ripe, but in the season of 1913, by means of coastwide advertising, the Durst brothers succeeded in assembling an army of nearly 3,000 persons, and at the time of the riot there were probably 2,800 workers in the camps, about half of them women and children. Of this number, fully 1,000 were foreign born males, including Syrians, Mexicans, Italians, Porto Ricans, Poles, Hindus, and Japanese. The American element was made up of wandering casual workers, poor persons from near-by towns, owners of small ranches in the foothills of the Sierras, roving hoboes, and a few families of the better laboring class from towns and cities, who often go to the hop fields for their summer "outing."

When this motley horde arrived at the Durst ranch, they found a desolate, sunbaked field, without shelter from the burning California sun. There were a few tents to be rented at 75 cents a week, but the majority had to construct rude shelters of poles and gunny sacks,

[1] Adapted from *First Annual Report of the Commission of Immigration and Housing of California* (January 2, 1915) pp. 15–50.

called "bull pens," while many were compelled to sleep in the open on piles of vines or straw.

There was a great lack of toilets, and even those furnished were but crude makeshifts. These unspeakable toilets were used indiscriminately by both sexes. There was a scarcity of drinking water, some of the wells were pumped dry, while others became infected from the surface water that drained back from stagnant pools, which formed in close proximity to the toilets and garbage piles. Under such shockingly insanitary conditions sickness followed as a matter of course. There were cases of typhoid and malaria, caused probably by these germ laden waters.

While the wage scale and other factors contributed to the feeling of discontent, the real cause of the protest of the pickers seemed to come from the inadequate housing and the insanitary conditions under which the hop pickers were compelled to live.

The Commission of Immigration and Housing decided that these conditions constituted an aggravation of industrial warfare, and that they could and should be changed. It was ascertained that the Durst camp was no exception; similar conditions existed in other labor camps throughout California and it was evident that a state-wide "clean-up" campaign was necessary. This task really came under the jurisdiction of the State Board of Health, but that body was without funds to do the work of inspection and of correction. Consequently, the Commission of Immigration and Housing, with the consent of the State Board of Health, decided to enter upon the undertaking itself, particularly because over one-half of the population of the labor camps of the state is made up of immigrants.

The existing state law pertaining to the housing and sanitation of labor camps was found to be indefinite and inadequate. It merely states in general terms that tents, sleeping quarters, and the ground about the camp must be kept clean. No way is provided for ascertaining the conditions of the camps, except through the occasional complaint of a laborer fearless enough to risk incurring the displeasure of his employer. Nor does the statute attempt to set forth a minimum standard of housing and sanitation. Owing to these weaknesses in the existing law, the Commission had first to work out a minimum standard of living conditions in labor camps. This minimum standard must be sufficiently high to insure results, but not so expensive and so impracticable as to deter employers of labor from adopting it, since

employers had to be persuaded, rather than compelled by law, to make the improvements suggested.

It was not until after eight months of experience in camp sanitation work that the Commission drafted a detailed law to govern labor camp sanitation. This law does not deal in generalities but makes specific regulations for every feature of the camp.

In order that it might be sure of its ground in the beginning, the Commission decided to take over a camp and make it sanitary, thus putting theories to actual test. This first experiment in camp sanitation was made at Shingle Springs, Eldorado County, where 129 men were employed by the state on the state highway. The sanitary engineer of the Commission was sent to the camp, where he installed sanitary camp latrines, shower baths, fly-screened cooking and dining tents, model sleeping quarters, garbage incinerators and other modern improvements at a minimum cost. The results were very satisfactory and a set of sanitation rules was drawn up accordingly. These rules and the practical suggestions for carrying them out were incorporated in a small pamphlet of seven pages, which met with the approval of the State Board of Health.

These pamphlets were distributed among camp operators, and two inspectors, under the direction of a sanitary engineer, were put in the field. Although most of the camps were below the minimum standard, the inspectors found that employers or operators were willing to co-operate in the effort to improve the conditions of the men, but they did not know *how* to go about the work. Consequently, a larger and more comprehensive pamphlet, containing detailed plans and instructions, was prepared for general distribution.

Believing that much of the abuse arose more through carelessness and ignorance on the part of those operating labor camps than because of any disposition to avoid the law, the whole spirit of the pamphlet was "co-operation and advice," rather than "compulsion."

During the months of June, July, August, and September, when the largest number of labor camps are in existence, from five to seven inspectors were kept in the field. The inspectors found little, if any, antagonism, some procrastination, and a great deal of good feeling and hearty co-operation. They reported their findings to the office of the Commission on blanks prepared for the purpose, which gave every detail of the camp inspected, including the number and nationality of men employed, permanent or transient, skilled or unskilled labor, living conditions, sanitary conditions, toilets, bathing facilities,

etc. A letter of instructions and a pamphlet were then promptly mailed from the main office to each owner or superintendent, calling attention to the special needs of his camp, and inviting correspondence with the office of the Commission if any difficulty arose in trying to make his camp conform to the requirements.

The active inspection began on April 10, 1914, and ended November 1, 1914. Practically no reinspections were made during this period, it being the policy to visit as many camps as possible during the summer months. Camps were classed as "good," "fair," and "bad," according to a rating established in connection with the minimum standard; 297 of the 876 camps were "good" and housed 21,577 persons; 316, housing 22,382, were "fair"; 263, housing 16,854, were "bad."

A striking feature of these statistics is the tabulation of nationalities. Forty different nationalities were represented, and of all the workers in the camps, 50.7 per cent were immigrant aliens; 49.3 per cent were American born and naturalized immigrants. The statistics as gathered do not show the proportion of the 49.3 per cent that are foreign born naturalized citizens. These figures show how close is the connection between the work of labor camp sanitation and the work of raising, or protecting, the standards of living of immigrants. In improving labor camp conditions, the Commission has done much to protect its immigrant wards, and has guarded against the lowering of the workers' standards of living by those races that are more careless and more ignorant in this regard.

The table further shows the presence of 2,659 women and 1,553 children in the camps as against 31,741 men. This comparison is of social interest and significance. A census gathered when the camps are filled to their ultimate capacity would probably show a larger percentage of women and children, since such a census would cover hop, berry, and fruit camps, etc., where women and children are more often employed.

The figures on the proportions of skilled and unskilled laborers are of economic and social value in that they throw great light upon the character of our casual or migratory laboring class. Of the 30,020 laborers concerning whom data as to skill were obtainable, 22,560 were unskilled and only 7,460 were skilled.

Up to January 1, 1915, 228 camps had been reinspected. The results are most gratifying. Where it was found that no effort had been made to correct abuses and improve conditions, the attitude of

"advice and co-operation" was changed and the operators have been warned that, unless they improve conditions as requested at once, the Commission will do all that is possible to prosecute them under the existing laws. The Commission will endeavor to have such camps as really constitute a menace to public health and safety condemned as public nuisances by the health authorities.

It is most important to note, however, that 72.3 per cent of the camps reinspected have been brought to at least the minimum standard. Many have surpassed it, and 77.1 per cent have actually carried out some of the suggested improvements. The camps which remained in the same condition represent only 14.1 per cent of the total. Only 8.8 per cent have actually retrograded, and only 5.3 per cent of these have slipped down to "bad."

It is also interesting to note that the owners of the Durst ranch at Wheatland co-operated with the Commission, and, under the supervision of the sanitary engineer, a model camp, complete in every particular, was constructed. In spite of the activities of agitators there were no riots or demonstrations and there is no doubt that the model camp was a factor in frustrating such attempts.

272. INTEMPERANCE AS A LABOR PROBLEM[1]

The liquor question has been emphasized to the Commission in all parts of the country as complicating the labor question. It seems to be regarded as a burning country life problem. Intemperance is largely the result of the barrenness of farm life, particularly of the lot of the hired man. The commission has made no inquiry into intemperance as such, but it is impressed, from the testimony that has accumulated, that drunkenness is often a very serious menace to country life, and that the saloon is an institution that must be banished from at least all country districts and rural towns if our agricultural interests are to develop to the extent to which they are capable. The evil is specially damning in the South, because it seriously complicates the race problem. Certain states have recently adopted prohibitory regulations, but liquor is shipped into dry territory from adjoining regions, and the evil is thereby often increased. There is most urgent need for a quickened public sentiment on this whole question of intoxication in rural communities in order to relieve country life of one of its most threatening handicaps. At the same

[1] Adapted from "The Report of the Country Life Commission," Senate Document No. 705, 60th Cong., 2d sess., p. 44.

time it is incumbent on every person to exert his best effort to provide the open country with such intellectual and social interests as well lessen the appeal and attractiveness of the saloon.

273. THE ACCIDENT HAZARD IN FARM WORK[1]

By DON D. LESCOHIER

The substitution of power machinery for hand labor has made agriculture a hazardous industry. Corn shredders, grain separators, gasoline engines, threshers, cream separators, and other forms of machinery have changed the character of agricultural processes until much of the labor in the industry has become more analogous, both in method and in danger, to factory work than to the earlier agriculture. Not only this, but much of the machinery used is far more dangerous than that used in most factories, for sufficient attention has not been paid to guarding it. The public has not known enough about the number and the causes of accidents on farms to realize that farmers need legal protection against unguarded machinery as badly as do factory workers. Prevention is further retarded by the fact that the accidents are distributed over so wide an area that the persons injured do not combine and crystallize a sentiment for protection. When five men in a factory are killed in a year, the operatives begin to ask why these accidents are happening and how they can be prevented; but when as many occur among the same number of farmers they do not realize that they have need to co-operate for protection.

Sixteen fatal accidents, two likely to prove fatal, eighty-five serious injuries, and thirty-two severe ones—a total of 135 accidents—were reported from Minnesota's agriculture during the past twenty months [September, 1911], eighty-two of them, including four fatalities, in the last four months. Probably we do not get a full report of all accidents; certainly the returns for the first twelve months were decidedly incomplete. The figures given must be considered as illustrations rather than statistics.

Forty-one per cent of these accidents occurred on corn shredders, which are the most dangerous agricultural machines in use in the Northwest. The Minnesota legislature passed a law (copied from Wisconsin) designed to prevent these accidents. Its purpose is, first, to require such an elongation of the hood over the snapping-rolls of

[1] Adapted from *The Survey*, XXVII (October 8, 1911), 946–50.

corn shredders that a man cannot reach in and touch either the snapping- or husking-rolls, and, second, to prohibit the operation of unguarded machines by incompetent persons. Vigorous efforts are being made by the labor commissioner to make the law effective, and these regulations will unquestionably stop most of the accidents, though it will be difficult to prevent the employment of any but competent men on the old machines. The ability to reach the rolls, and the youth and inexperience of many of the operators are the prime causes of the casualties.

Corn shellers cause accidents similar to those on corn shredders, but not so many of them. The wood saw is another dangerous machine on Minnesota farms, and, in the last five months, six serious accidents have been reported from its use. Most of them could have been avoided by a guard on the saw. Belts and gear-wheels probably rank next to corn shredders as causes of unnecessary accidents. The belt accidents are due either to attempts to put on or take off belts with the machinery running, or to unguarded belts. We can see no reason why light, transportable guard fences cannot be used to guard the belts of machines moved from farm to farm, and a permanent guard be used to protect belts on stationary engines, as similar belts are protected in factories.

The number of gearing accidents indicates that they, too, are to be seriously considered. While oiling machines, the oiler frequently gets his hand caught in the gears or a sleeve or glove catches in the exposed cogs of a gasoline engine or other machine. Nearly all such accidents could be prevented by covers over the cog-wheels. An inspection of the agricultural machinery on exhibition at last year's state fair revealed that it is the common thing to leave dangerous gear-wheels entirely uncovered. The manufacturers allege that the farmers want the machines at the lowest possible cost, and they must economize wherever possible in manufacturing them.

Occasional accidents occur on a number of other machines—such as hay presses, cream separators, corn binders, hay and litter carriers, mowers, and grain separators—but in most cases the accidents are due either to a special carelessness on the part of the person injured or to one of the causes we have already noted—especially gear-wheels or belts. In our list of 135 accidents, four farmers were badly injured by dynamite while blasting stumps. They clearly lacked knowledge of how to handle the explosive. One farm laborer was killed by a vicious bull and another seriously injured; three were badly hurt by

horses. A farmer descending a wheat-stack lost his balance and fell on a pitchfork, sustaining injuries from which he died. Two threshers were going up hill on a threshing engine. The machine "reared up" as a horse rises on its hind legs. They jumped and ran. The machine came back to the ground and, uncontrolled, followed one of the men to the fence, crushing him to death. Two others were crushed, but not seriously, between an engine and a separator, because of the breaking of a coupling-pin. A farm laborer fell in front of a gang-plow. He was caught by the plow-share, and his leg was terribly lacerated. A farmer trimming one of his trees fell to the ground and was killed. Another was thrown from a wagon that tipped over while turning. His shoulder and several ribs were fractured.

B. Finding Men and Finding Jobs

274. HARVEST HANDS IN KANSAS[1]

The bumper and super-bumper crop in the West is making insistent and desperate demands for more laborers for the coming harvest. A report from Kansas given to the *New York Evening Post* says that the need in that one state includes 42,000 extra men, 6,300 extra teams, and 2,300 cooks. In explanation the account continues:

The average county in the wheat section has a small population. The farms are large, the towns small. Take Pawnee County, for instance, out in southwest Kansas. It has a population of 8,500 or 1,700 families. There are 275,000 acres of wheat to cut and thresh. If every available man in the county could be put at the job, the work could not be done during the short period during which wheat must be handled. Once ripe the heads shell freely, and the grain must be garnered. As harvest approaches, the farmer begins to call for help. This has been developed into a system. With a State Labor Bureau in correspondence with county officers, city officers, city clerks, farmers, and township officers, the needs are tabulated. Even the fraternal orders have taken a hand and have sent back to Indiana, Ohio, and other states to fraternities to send men west. Hundreds of college boys have been enlisted and have come to the harvest fields for the experience and to earn vacation money.

The railroads are co-operating, either willingly in acting as agents for the farmers, or willy-nilly as the furnishers of under-car berths and side-door Pullmans to those who do not stop for the formality of ticket purchase. In the latter case, the railroads, realizing the extremity

[1] Adapted from the *Literary Digest*, XLIX (July 4, 1914), 37.

issue orders for lenient treatment of "dead-heads." There is no eight-hour limit—unless it be the "eight hours before dinner and eight after dinner" that is the current phrase. The 40,000 men in Kansas then will draw over $100,000 a day for labor alone, to say nothing of the expense of feeding them.

The class of men coming west for the harvest is far above that of the average tramp—workmen from lumber camps, factory men, college boys, small farmers from adjoining states. The employment agencies handle the larger portion out of Kansas City and they go in groups to the little western towns. While the handling of the army of men appears a haphazard affair, it is really systematized through long years of wheat raising, and the workers are distributed with promptness. The workers begin at the southern border of the state and move north with the ripening of the wheat, getting a month or more of steady work.

275. JAPANESE LABOR CONTRACTORS[1]

By H. A. MILLIS

The importance of Asiatics in the farm labor situation of California has been due in considerable measure to their effective organization in "gangs" under "bosses." Japanese bosses are the most numerous labor agents, as that race predominates in the labor supply. In nearly every town constituting a center of a specialized agricultural community, one or more Japanese "bosses" can be found. These "bosses," "labor contractors," or "employment agents" are the leaders of the groups of Japanese laborers whom they associate with them. Usually the smaller "contractors" conduct lodging-houses and stores, where their men live on a co-operative plan. The "boss" secures work for his men from the ranchers, and carries on all dealings with the employer as to the wages or contract price for the work, collects the wages for the "gang," and pays the men their individual earnings, of which he keeps their separate accounts. The contracts for the handwork in intensive agriculture are sometimes written, occasionally with a bond required to guarantee the work, but more often they are oral. Some contracts are to the effect that the "boss" is to furnish a sufficient number of men to properly do the work required at the time specified by the rancher, who agrees to pay a certain wage per day to each man.

Some large Japanese contractors take contracts for the handwork on many ranches and have hundreds of laborers under them. These

[1] Adapted from *Reports of the Immigration Commission*, XXIV, 17.

"gangs" are sent to the different ranches, each group of men frequently finding work for the entire season on a single large ranch, under the direct supervision of a "boss" or agent of the contractor. The rancher secures any number of men desired through these contractors, and his only concern then is to see that the right number are present and do the work properly. By co-operating with Japanese employment agencies and boarding-house keepers in the larger cities, these "bosses" are ordinarily able to secure any number of men desired. In this way the "bosses" and contractors direct the migration of Japanese to communities where the season requires a large number of workers, and so tend to equalize the labor supply of the state.

276. THE PADRONE SYSTEM[1]

By FRANCES A. KELLOR

The immigrant reaches the labor camp usually by way of a padrone. From the time he arrives until he goes to work in the remote camp he is in the hands of his "friends"—countrymen who house him and feed him and entertain him, certain that they will get their share of the fee for his job and of the profit the "commissary" makes off housing and feeding him when he is "on the job." He has no chance to see America through contact with Americans, and is as subject to industrial routine as a checked piece of baggage is to transportation rules. Furthermore, whenever he protests or makes inquiries, he is told that this is America and that to protest means the loss of his job.

Now add to this environment and threat the facts that he cannot speak English, that he has little money though plenty of strength, that he has dependents who look to him for their daily bread, that he is probably in debt for his passage over and for his railway ticket to the camp, and that he will be deported if he fails to find work and applies for public help, and we have a fair illustration of an immigrant *choosing his occupation.*

When the laborer arrives at the camp, he is initiated into the routine of American industrial life by the padrone or sub-contractor, who, on the one hand, convinces his employer that he can keep his men only by letting them live the way they do in Italy, and, on the other hand, convinces the workmen that they can hold their jobs only by living the way they do in America.

[1] Adapted from the *Outlook*, CVI (April 24, 1914), 912.

As the company's agent, the padrone naturally can dismiss the man who objects to his dispensations, or can bully him into accepting them. He can also prevent his being employed by other padroni. The padrone's profit comes from two sources—from the fee he charges each man for his job, and from what he can make off the housing and supplies furnished to these men. The laborer has to buy his food from the padrone, who in many camps is allowed to deduct a fixed amount from the laborer's wages every month, whether the man buys that much or not. Sometimes the food is so stale and worthless that the man throws half of it away and buys more somewhere else. He has no place but his bunk in which to keep his food.

NOTE.—While the above remarks apply primarily to conditions in construction work, the agricultural laborer has not been any more gently dealt with by the padrone. Similarly, while the preceding section speaks only of the good offices of the Japanese "boss," it not infrequently happens that he exploits his helpless countrymen without stint or mercy. Many private employment agencies have been not less predatory in their dealings with foreigner and American alike. Attempts by state agencies to secure a satisfactory distribution of farm labor have as yet met with only partial success.—EDITOR.

C. Woman and Child Labor

277. SOME INTIMATE GLIMPSES OF WOMEN'S LABOR[1]

Michigan.—If there is one place where the American farmer excels it is in getting the utmost out of his wife and family. He will not co-operate, but the combined work of self, wife, and family produces a living that another man earns for himself and his family. The business and home are so close together, the demands of the business so insistent, and the farmer so needing help that he just naturally assumes control of all, and the woman is no longer boss of her own time. On the farm she is the partner in the expenses of the farm. She is the partner when it comes to picking berries, cucumbers, etc., and the farmer doesn't pretend to grow stuff for the cannery unless he has a wife and children who can do the picking, etc. He cannot afford to hire it done.

Minnesota.—From the experience of thirty years in the store business in northern Minnesota, I do not hesitate to say that over one

[1] Adapted from *Report No. 106, Office of the Secretary, United States Department of Agriculture*, pp. 10, 16, and *Report No. 103*, pp. 46–52.

half of the total work done on the farm has been done by the women of the house, besides doing all their cooking and mending and raising their families.

Kentucky.—The woman does 50 per cent of all the work on the farm except at the plow, such as clearing up the land, hoeing the corn, potatoes, cabbage, beans, etc.; the woman does the same as the man in gathering the corn, potatoes, etc. The woman does the work at 50 cents per day and will ask for the work, while the men hands can't be employed on the farm for less than $1 a day.

Mississippi.—To look at the careworn, tired faces and bent forms of the "bride of a few years" in our hill sections, where servants are scarce, we realize at once our personal and national neglect and are astounded at the enormity of it. I wonder if the gentleman has ever seen a woman plowing cotton with oxen, and what he would think if he knew that this woman's husband was working at a sawmill several miles away and it was her daily task to get up and cook his breakfast so he can be at work at six o'clock. And yet this is a common sight in the rural districts. The women living on farms, in addition to bearing and caring for their children and doing their own housework, work in the fields during the months of May, June, and July, which is the hoeing season, and in September, October, November, and December, which is the cotton picking season.

Oklahoma.—Our young girls' and women's health is ruined from dragging big heavy sacks of cotton up and down the cotton rows. A farmer's wife toils like a slave from before dawn until far into the night, trying to do her housework and be a field hand too.

Texas.—The routine of the southern farm woman is about as follows: At this time of the year she is up at 5 o'clock preparing the breakfast, after building her own fire; milks the cows, cares for the milk—churns the cream by hand; puts the house in order, gets the dinner, eats with the family at noon; leaves the house in disorder, goes to the cotton field and picks cotton all the afternoon, often dragging a weight of 60 pounds along the ground. At about sundown she goes to the farmhouse, puts the house in order, washes the dishes left over from the noon meal, prepares the supper—most of the time too tired to eat; gets the children to bed, and falls asleep herself—and so it goes on from day to day. Somehow she finds time to do the washing and ironing, mending, knitting, and darning between times. During the child-bearing period, there is generally a further drain on her strength. The result is she is weak and frail as a rule.

There are a few well-to-do farmers in whose homes we find better conditions, but the above description applies to negroes, to white tenants, and to young farmers who are trying to build their homes. Often the health of young girls is everlastingly ruined through work in the fields. I have in mind a case: A girl eighteen years old married a farm tenant. She did all the things I have described, and was the mother of seven children during the eleven years of her married life. Four of these children are dead; the three living are frail of body and weak of mind. The mother is at this writing crazy as a loon. Do you wonder! In neither branch of the family is there any insanity. Simply killed by work and worry—that's her story.

278. CHILD LABOR IN THE BEET FIELDS[1]

By EDWARD N. CLOPPER

The youngsters of the Colorado sugar-beet fields do not chase butterflies or splash 'round in the old swimmin' hole; they are "beeters"; and they are in the fields to labor. Colorado produced more tons of beet-sugar in 1915 than any other state—about a quarter of a million tons—and local school superintendents estimate that 5,000 boys and girls from six to fifteen years of age helped to put the state in the lead. These children lose so much time from school in the spring and especially in the autumn that for years the situation has been one of the most serious problems facing educators in the beet-raising sections.

Most of the children are from seven to thirteen years of age; superintendents state that from 80 to 90 per cent of the children included in their estimates are under the age of fourteen years. Only rarely are the children found to outnumber the adult workers in a single field. Viewed in the aggregate, about 7 per cent of field workers are children under fourteen years of age. It is only because the industry is extensive in Colorado that so large a number as 5,000 boys and girls are involved. Consequently if the labor of children under fourteen years of age were eliminated the industry would not suffer.

The children are almost invariably members of the family living on the land, although their residence there is usually only during the

[1] Adapted from *The Survey*, March 4, 1916, pp. 655–59. A somewhat fuller treatment of the subject by the same author may be found in *The Child Labor Bulletin* of February, 1916, pp. 176–206.

"season." Their work in the fields begins in spring with the process called "thinning." The beet plants come up in clusters, and are then pulled out until only single ones, about eight inches apart, are left in the rows. Boys and girls of seven or eight years and upward work steadily at this task throughout the day, bending over the plants, their nimble fingers enabling them to keep pace with the adults. The next step is hoeing. This is not so tiring as thinning because the posture of the worker is more erect; and being a heavier kind of labor, it cannot be performed by the very young children.

The first process in the harvesting is called "pulling." The soil between the rows is broken up by an implement called a "puller," resembling a plow. This simply loosens the soil about the beets and does not throw them out, hence some exertion is required of the workers who finish the pulling by hand. Walking between two rows and grasping the tops, the child pulls a beet with each hand. Then he knocks the two beets together to dislodge the clinging soil, throws them into a pile near by, and stooping again, pulls another pair. A child must often exert his full strength, especially when the ground is "caked" or is very moist and sticky. After having been pulled, the larger beets were found to weigh, with the tops and attached soil, about 12 pounds each, the average weight of the beets alone being 5 pounds. The scope of this inquiry did not permit a scientific study of physical effects, but it would appear that continuous handling of these beets throughout the harvest season, combined with the steady stooping, involves a great physical strain and is therefore a very objectionable form of work for children. The writer saw children of seven and eight years performing this heavy labor, and instances were found of children working from 6:00 A.M. to 7:00 P.M. in the rush season, their average work-day being from 6:00 A.M. to 6:00 P.M.

The next process in harvesting is "topping," which is done at intervals after a few rows have been piled. Each worker provides himself with a huge knife about sixteen inches long, having a sharp prong at the end by means of which the beet is lifted from the pile. A child holds the beet against his knee, and with a vigorous stroke cuts off the top. The beet is fibrous and a sharp blow is required, and as the knee is not protected, children not infrequently hook themselves in the leg. This work also is unsuited to young children, and as the work-day is long, common sense protests that the effect upon them cannot be other than harmful.

The amount of energy put forth by boys and girls in these harvesting processes is much greater than appears upon casual observation; indeed, the owner of one farm declared that the ten-year-old daughter of his contractor topped five tons of beets daily. This represented the child's net achievement—as a matter of fact, the total tonnage was greatly in excess of this amount, because in the course of the day a beet passes through the hands of a worker twice, first when pulled, then when topped; moreover, the weight of soil and tops and the condition of the ground must be considered. The aggregate weight handled by the child daily is therefore much more than five tons—this ten-year-old girl was really handling from twelve to fifteen tons.

Exposure to the weather in late autumn is another factor making the work in the fields undesirable for young children. They are often insufficiently clothed on cold days. Their hands become badly chapped and many distressing cases of suffering are cited by school teachers. It is by no means unusual to see families pulling and topping in mid-November, when ice is in the furrows and keen, cold winds are blowing. Sometimes the children work in the early morning and late evening by lantern light; and occasionally, when a heavy frost is feared, the work is continued even on Sunday, particularly toward the end of the season.

Through energy, persistence, and thrift many families earn and save enough money in a very few years to enable them to buy small farms, but this worthy ambition ceases to be a virtue when pursued at the sacrifice of the children's proper education and normal childhood. A prosperous beet raiser in the South Platte River district keeps his six-, eight-, and ten-year-old children out of school to work in the fields, although he owns more than two hundred acres of valuable land. Another family, consisting of father, mother, and two girls aged nine and ten years, who worked 40 acres of beets in 1915, own a good home in one of the large northern towns of the state; this home is boarded up for half the year while the family lives in a little shack "in the beets." An eleven-year-old girl was found who, with her sister aged seven, is kept out of school to work in the beet fields, although her family boasted that they made $10,000 from their farm. One parent declared to a school principal that his boy was worth $1,000 for work during the beet season, but if he went to school he was nothing but an expense.

Financial considerations, and not the welfare of the child, lie at the center of vision in the narrow perspective which characterizes the

lives of so many of these families. The houses are really nothing but shanties, poorly constructed and equipped, and are designed for temporary residence only. This reveals the readiness with which the workers sacrifice all comfort and even necessaries to the immediate needs of the work. The children of these families are not permitted to attend school regularly throughout the school year, for their parents insist upon their helping with work in the fields.

The Colorado compulsory education law is not enforced in the beet sections. Children of all ages are absent for months at a time and no action is taken. This disregard of the law is unfortunate from every point of view, and if the present and future welfare of these children is to be conserved the people cannot afford to tolerate these conditions longer. The school teachers call attention to the grave mistake of permitting the children of these immigrants to grow up in ignorance, as unassimilated masses; to the waste of money spent on ineffective schools; to the loss to all the children, non-beet-workers as well as beet-workers, due to the disorganization of the schools; and to the impossible task laid upon the teachers themselves, who are expected to get good results under such conditions. Otherwise Colorado is trying to establish high standards for rural schools, but all these efforts are of no avail unless the children attend. The failure to enforce the compulsory education law in these districts is of such long standing that families now look upon attendance as optional. Many a teacher says, "What can we do to enforce attendance when the members of our own local school board keep their children at home to work in the fields?"

The consensus of opinion is in favor of what is known as the county unit system which would make the county into one school district with a county board of education; this board could then employ a truant officer to enforce the law through its jurisdiction. Some such step is necessary to insure the effective enforcement of the school attendance laws. The welfare of the children of these districts actually depends upon this issue.

NOTE.—Colorado is not the only state in which child labor constitutes a real problem of rural life. There are the children of the onion fields, the potato fields, the berry fields, and—perhaps worst of all—of the cotton fields. The following accounts of child labor in cotton sections are taken from the letters from farm women to the Secretary of Agriculture (*Report No. 105, Office of the Secretary,*

United States Department of Agriculture). The first paragraph is by a Georgia correspondent, the second by one in Tennessee.—EDITOR.

I think we need compulsory education for children in the country, so all the children could get an education; but until the farmers of the South quit planting so much cotton the children will grow up in ignorance. They cannot spare them from the fields; so the good woman is compelled to see her offspring grow up without schooling.

How few know that it is common for children five and six years of age to have little sacks fastened about their necks and go into the cotton fields and pick cotton as long as their little strength lasts. Talk about "child labor" in factories! The factory child has Sunday clothes, eats candy, chews gum, and knows Santa Claus, while these poor little cotton pickers often are bareheaded and barefooted. Our mails are burdened in behalf of our little brown brother, red, yellow, and black brother, but never a word for the pale-faced blue-eyed babies brought up in the cotton fields.

D. The Coming of the Union

279. FARM HANDS ON STRIKE

FORT SMITH, May 2, 1916.—Farm hands employed at Moffett, Oklahoma, and vicinity, opposite Fort Smith, Ark., went on a strike Monday because their employers refused to increase their wages from $1 to $1.25 a day. The number of strikers cannot be learned, but it is understood that the movement has affected many. Several farmers and planters from the Moffett region who were in Fort Smith Monday stated that their employes were not in sympathy with the strike, but refused to work for fear of being dealt with violently.

Some planters assert that the Working Class Union, which has a large following among the farm laborers in many parts of Oklahoma, particularly in Sequoyah County, is behind the strike.

280. AGRICULTURAL LABORERS' TRADE UNIONS IN FRANCE[1]

On the eve of the outbreak of the European war, M. A. Souchon, professor of law in the University of Paris, published an important work entitled *La Crise de la main d'œuvre agricole en France.* He gives a complete summary of the condition of the question on the eve of the European war, i.e., just at the moment when this question

[1] Adapted from *Monthly Bulletin of Economic and Social Intelligence, International Institute of Agriculture* (December, 1915), pp. 17–32.

must be considered as entering upon a new phase. A few of the important facts are as follows:

Till the end of the nineteenth century the question of trade unions had never arisen among French agricultural labourers, and it seemed improbable that it would ever arise, because these labourers were isolated from one another, leading the same life as their employer, working with him, and eating at his table. It was among the woodcutters of the central parts of France that the question first attracted attention. The position of these woodcutters seems to be somewhat peculiar. According to M. Souchon they are only employed in the woods for a part of the year. During the months of November and December they are occupied in felling trees, and for a fortnight in spring in barking them. This trade not being exercised continuously, a woodcutter must have other means of support. He is generally also an agricultural labourer.

Toward 1891 there was a considerable depreciation of wages which led to strikes, the first of which were not planned by any pre-existing organization, but during the cessation of work syndicates were constituted. In June, 1892, fifty syndicates in the department of Cher alone met in a congress, and claimed to represent more than 6,000 workmen. In the course of two seasons, 1891–92 and 1892–93, the workmen succeeded in having their wages nearly doubled.

The syndicates rapidly disappeared, but in 1902 under the auspices of the General Labour Confederation, the Labour Exchange of Bourges organized a congress of woodcutters at which the foundation was laid of a *National Federation of Labourers on the Land.*

The woodcutters' syndicates acted not only through strikes but also tried to work by appealing to the force of the law and by the extension of co-operation, but M. Souchon believes that these efforts were merely secondary. They sought legal intervention to secure the extension of laws respecting the labour of women and children to agriculture, to claim for labourers in the state forests the application of the decrees of the 11th of October, 1899, respecting state contractors, and to obtain the appointment of agricultural experts. The syndicates have often demanded that the state should manage its own forests directly through its own agents, the exclusion of dealers facilitating the formation of co-operative societies of woodcutters. The woodcutters' syndicates have in fact taken up the question of co-operation, and in 1905 at their annual congress, they drew up a vast programme of co-operation for consumption and for production

on a basis of communism. Souchon considers that hitherto the results have been very small.

Vine culture, after that of textile plants, has always been in France the branch of agriculture most remunerative to the cultivator.

Since the invasion of the phylloxera and the replanting of the vineyards, requirements for successful culture have greatly increased, one, as an instance, being the use of sulphur and of sulphate. There is more work to be done, and that the farm servants may not suffer in consequence many day labourers must also be employed. M. Souchon points out the distinction between work in vineyards and other work.

The vineyard labourers have a hard time. They work from sunrise till sunset with an interval of three hours for rest. This represents twelve hours per day at the beginning, becoming less, however, as the days shorten. Sundays are not exempt, and the only days of rest are those when all work is prevented by rain. Some years ago time-wages were the rule, but during the last seven or eight years attempts have been made to introduce task-wages. The wages vary in character. Vinedressers strangers to a locality are in the first place lodged by the proprietor who employs them. They sleep in a loft on a little straw, but such meagre hospitality can scarcely be considered remuneration. Sometimes their travelling expenses are paid and they are given their evening meal and wine. But their payment is generally made in money. Women grape-cutters receive but half the sum paid to men, but the men are expected to carry the grapes.

For both men and women payments differ with seasons, districts, and even vineyards, but on an average, men receive four francs per day and women two francs per day, a rate which seems sufficient to allow of some saving by the recipients who for the greater part are mountaineers accustomed to lead a very frugal life. Yet they often spend much during their stay of three weeks or a month in the vineyards, and so have but little to take home.

Other day labourers often remain connected with the same property for months and even years but not continuously, for they are only called on when there is extra work to be done. M. Augé-Laribé, quoted by M. Souchon, calculates that such a workman is generally employed 230 or 250 days annually. To them the care of the more delicate work is entrusted. The men are employed in pruning, grafting, sulphur and sulphate spraying of the vines; the women at easier work, such as the tying-up of the vine shoots or, at the time of spray-

ing, the refilling of the cans. As women are so poorly paid, proprietors are often tempted to employ them instead of men. For this reason, the men protested energetically against the employment of women and often succeeded in preventing it.

Ordinarily, to get through the tasks allotted them more quickly, the vinedressers unite in groups called *bricoles* led by a chief workman called the *moussègne*. This collective work, like that of the woodmen in the forests, has much aided the development of syndicates.

The working hours of day labourers in the vineyards are short, being seldom more than eight. Their wages kept constantly rising from 1820 until the appearance of the phylloxera, and then from 1875 they began to go down, until in five or ten years they reached a proportion of about 50 per cent, and they would have been lower still but for the exodus of many of the workers. With the replanting of the vineyards better times came, but no years have ever been comparable to those between 1850 and 1875 for prosperity. In 1900 and the years following there was another fall in wages owing to the failure in demand. In April, 1903, hard frosts destroyed the vintage of the year, and employers dismissed many of their workmen, while they abruptly cut down the wages for the others by 30 or 40 per cent. In Hérault M. Souchon believes that he is near the truth in stating that in 1913 the ordinary daily wages in winter were 2 fr. 50, and in summer from 2 fr. 50 to 3 fr. 50. These figures seem very low when we remember that there are frequent intervals in vineyard work. Besides, the southern labourers generally live in the cities or large villages, thus losing the advantages of a completely country life, one of which is the profit made on pig or poultry rearing. Their rent too is high, being calculated by M. Augé-Laribé at an average of 80 to 120 frs. Lastly, the continual cultivation of one kind of crop is prejudicial to the interests of the south through the risk of overproduction, and it is also one cause of the higher cost of living. Bread, for instance, is a much heavier item of expense to the vinedresser in the south than in any other part of France.

On the 15th of August, 1903, a first congress of vinedressers and labourers held at Béziers comprised 31 syndicates. In the following November the first strike of any importance was declared, and resulted much to the satisfaction of the workmen. In January, 1904, agitation increased, spreading from Hérault to Aube and Pyrénées-Orientales, and in April and May of the same year to Bouches-du-Rhône. According to the statistics of the Labour Office, more than

150 strikes of vinedressers took place between November, 1903, and May, 1904, affecting about 50,000 strikers. From a strictly economic point of view the workmen obtained considerable advantages, of which the chief was an increase in wages. But it is difficult to know the exact importance of the results of the congress, because the movement has entirely failed as to unanimity in its requirements.

The question of wages was not the only one under consideration; that of the evils resulting from the long intervals in the work of the vineyards calling for special attention, and syndicates proposed various plans as a remedy. They also proposed restrictions upon the employment of outsiders, of women and of children, and prohibition of extra hours and of work by the job—all with a view to retaining the work for themselves. But on these points success did not follow as in the case of day labour, and the little obtained was very incomplete. At first many agreed to the prohibition of women's work, except for the replenishing of the sulphur cans, and some of the proprietors agreed to employ workmen of the commune. It was invariably specified that extra hours should be paid at the same rate as the daily work, a notable improvement, as proprietors had hitherto expected extra work on pressing occasions to be done either gratis or for a very small remuneration.

Unhappily these good results were very precarious. At first proprietors had been taken by surprise and they soon sought means of retaliation. The judicial forms stating the agreements were generally very inexact, and a strike was seldom ended by a true collective contract. Generally the workmen were satisfied with a written minute, trusting for modifications to local usages, with nothing to show that the parties were bound by any legal obligation. This proved to be the germ of new conflicts which were not slow to break out.

A second congress of southern workmen was held at Narbonne on the 13th, 15th, and 16th of August, 1904. At this congress 107 syndicates were represented. The members seemed very much struck by the diversity of claims and the results obtained since the last strikes. Without taking into account that the customs and economic conditions are not identical in all the vine-growing districts of the south, the congress laid down a uniform system of regulations for all. But while this programme was far beyond the results already obtained, it must be acknowledged that it was in great part a failure. Since the winter the demand for wine had been small and the pro-

prietors felt the impossibility of employing many workmen under the conditions imposed upon them. And partly from necessity, partly in retaliation, they dismissed many of the workmen they had engaged, and left hundreds of day labourers without work. When they consented to re-engage them, it was at a lower rate.

The question for the syndicalists was then to insure respect for the agreements already made, and to obtain new concessions, unattainable without further struggles. So the question was put to the congress at Narbonne, whether the time had not come for a general strike of vinedressers. The idea was approved, but referred to the Federal Council which proclaimed the strike on December 1st, 1904.

It proved a failure, and was fatal to the prestige of syndicalism in the country districts of the south. A rapid diminution in the number of syndicates and syndicalists was soon observed. In 1904 the Vinedressers' Federation comprised 145 members and 14,084 subscribers; the year 1905 closed with 157 syndicates and 5,551 members; the year 1906 with 143 syndicates and 3,366 members; at the end of October, 1907, there were only 109 syndicates and 1,721 members. At the same time, the surviving organizations seemed to lose interest in the movement.

Southern workmen are less tempted by strikes, because much can be obtained without them. Since the increase in the price of wine many proprietors willingly pay their workmen 50 centimes per hour, a sum formerly regarded as a maximum, and there are often special indemnities, either on account of the high cost of living or for performing specially hard work. Another cause is that the small proprietors are rapidly increasing in numbers. Before the phylloxera crisis they were very numerous, but owing to that calamity they almost entirely disappeared.

In spite of the more systematic character of the new mode of cultivation a labour conquest of the land was begun, but interrupted by the frost of 1903 and still more afterward by a failure of demand. At the present time subdivision is reappearing. The employers are more energetic, and though they have no organizations comparable to those of the forest proprietors described by M. Souchon, yet more than once strikers have been met by a well concerted opposition. In 1912, at Ouveillan, in Aude, there was an attempted strike. The employers collected all the men who were willing to work, and formed them into strong gangs, thus frustrating all efforts at intimidation. Then they hired all the habitations in the village as the leases expired,

and succeeded in forcing the ringleaders to go away by refusing to take them as tenants. At Thégan-les-Béziers, in Hérault, there were strike-breakers who went in succession to all the lands abandoned by the workmen. At Vauvert in Gard there is a company for mutual insurance against *sabotage*, which seems to have been the means of considerably diminishing the number of acts of violence. At Marsillargues in the *arrondissement* of Montpellier harmony was restored through the constitution of a co-operative society for the warehousing and sale of wines. All the workmen proprietors have an interest in joining it to secure a better sale of their produce, and they are thus withdrawn from the workmen's syndicate which moreover does not admit any members of the co-operative society. Doubtless, these are only isolated facts, but M. Souchon does not hesitate to regard them as symptomatic of a new era.

Rural syndicalists are for the most part vinedressers, woodcutters, and gardeners. In their ranks may also be found metayers of the Bourbonnais, day labourers of Ile-de-France, and even some farm servants of the Cemtre, but these form only a small minority in the whole or rural syndicalism. In all there may be 642 workmen's syndicates in agriculture, forestry, fishing, and cattle-rearing, comprising 60,724 members, that is, only 2.22 per cent of the whole number of wage-earners. M. Souchon believes that taking into account the continued extension of syndicates of factory workers we may conclude that there are between the two forms of labour great differences which throw difficulties in the way of the extension of syndicalism among rural workers.

XVII

PROFITS IN AGRICULTURE

Introduction

Profits are commonly defined as that part of the return to a business which remains in the hands of a proprietor after operating expenses, rent, wages, and interest have been paid. Now, since agriculture is a business in which a large proportion of the workers are directors of their own enterprises, it might seem that the question of profits in agriculture would early have been made the subject of careful and extended study. A mere glance at the readings in this chapter, however, would suffice to dispel any such illusion. The fact is that agriculture is one of the forms of business in which least progress has been made toward identifying and explaining the phenomena of economic or pure profits. The gross return of the farmer, after deducting cash expenses, has commonly been spoken of as his profit, and only recently have we begun to allocate any part of this lump sum to other accounts—rent upon the land he owns, interest upon invested capital, wages for his family and himself. The fact that there are relatively few contractual incomes in farming has made it difficult to ascertain what the amount of the residual share would be if all such prior claims were recognized.

Such exposition of profits as we do possess has been developed largely from the study of industrial and mercantile enterprises. There, functions were more specialized, the sources of income more clearly differentiated, and contract payments more common. The economist readily perceived a fourth share of the total gains of business enterprise, which remained frequently, and sometimes in strikingly large amounts, after all the participating land, labor, and capital had been rewarded at the contract rate. He noted that this entrepreneur surplus might be due to skilful selection of helpers, shrewd or lucky purchase of materials, or clever organization of the operating plant (all of which lower his costs); or to a particularly canny selection of the enterprise on which he should embark, to a superior selling ability, or to the artificial advantages of a monopoly position (all of which enhance price and the gross returns of the business).

Professor Seligman, in selection 281, analyzes these various sources of profits and groups them under four heads, from "ordinary" profits, through chance and speculative profits, to the extraordinary gains exacted by monopolistic force. In the selection which follows, Professor Fetter makes the point that, whatever the precise source of profits, their benefits accrue only to the one who has assumed the direction, and with it the risks, of the business. From this he argues an identity between control of capital and that opportunity which leads on to fortune.

How well do these theories of profits fit the concrete circumstances of agriculture? Do the figures seem to indicate that there is an ordinary rate of profit which remains to self-directing farmers over and above rent, wages, and interest? And do the highest labor incomes exceed the earning power of the farm manager on a salary basis? In order to answer the necessary questions touching profits, it is evident that we must keep within our view not merely such material as is presented in this chapter but also the data for farm wages, agricultural rent, and rural interest rates. For even though there is a nominal differentiation between landlord, capitalist, laborer, and entrepreneur, their functions are in diverse ways commingled. Thus, the so-called landlord, under one of the many forms of lease in which he retains a considerable share in the direction of the farm operation and receives a share of its product, is an active entrepreneur and adds a slice of profits to the share of the farm income which he receives as economic rent. Likewise, the capitalist who ventures his capital in farm operations in which he knows there is a considerable element of risk makes his contracts in such a way that his return will be more than mere interest upon safe investments. He is virtually a partner in the business; shall we not call this super-interest profits?

In both these cases, access to profits has come through the possession of capital, whether invested in land or other goods, and indicates ways in which the cream of the returns which come from farming may be diverted from the farmer himself to the landowner, banker, storekeeper, or whoever furnishes the financial assistance by which alone he can put his operations through. This suggests a further question: To what extent is it also true that the lack of capital on the farmer's part is responsible for the passing of control of his product into the hands of others who derive all such profits as come by luck, by speculation, or by monopoly control? In the long run, do farmers

tend to get the bare cost of producing their wheat, and the dealers who finance the marketing of the crop all the profits?

While control of capital clearly does give a tremendous advantage to its possessor in the distributive struggle, we must not admit too easily that it is the whole story. I have suggested in the Introduction (p. 4) that the pioneer was a true entrepreneur, deriving profits both from farm operation and from land speculation, by virtue of his ability to control a supply of labor rather than capital. The same holds true today. In some sections of the West owners of land have had to give up active utilization of their ranches (to the end of securing profits in addition to wages, interest, and rent) and accept the modest returns which belong with passive uses of capital. They have been forced to lease to the aggressive Japanese, who took advantage of their ability to control an adequate labor force of their countrymen, to secure for themselves the cream of profits which would otherwise be skimmed by those who held the position of entrepreneurship by virtue of their ownership of the land. We need to scrutinize further the circumstances which put one or another member of the rural group in the position of residual claimant for such surplus as agriculture produces over and above its contractual costs.

Finally, there is a problem of the utmost social import which we should discern underlying the facts of profits in agriculture. This concerns the relation of profits to progress. "In ordinary enterprises," says Professor Seligman, "profit is the great lure of energy, and competition the great destroyer of profit. Competitive profits, the union of both, are hence the symptom of progress. In the long run the ability to take advantage of chance fluctuations plays into the hands of society at large." To accept this view is to destroy the grounds of our complacency over the absence of great profits in agriculture, since it is the sign also of an absence of that advancing efficiency out of which individual fortunes are created. It suggests that the passing of the remarkable democracy of our agricultural class may be the passing of a democracy of inefficiency, and the emergence of some large incomes for those who do farming in a large way (see section C) may be a sign that new leaders are beginning to set new standards of attainment in this ancient calling.

A. The Doctrine of Profits

281. THE NATURE AND SOURCES OF PROFITS[1]

By EDWIN R. A. SELIGMAN

Profits are the income from business enterprise, and the entrepreneur may deal in labor, in land, in capital, or in all three. It is hence inexact to speak only of the profits of capital.

The best method of gaining an insight into the nature of profits is to consider, first, ordinary profits. By ordinary profits are meant the profits of a regular business that deals in a repetition of analogous transactions in competition with others. The term normal profits which is sometimes employed is less satisfactory, because it incorrectly implies that there is such a thing as a normal or general rate of profits, as well as because it brings to mind the conception of normal value; whereas profits are a result of fluctuations in market values and would not exist in a state of normal equilibrium. Profits are always a surplus—the difference between the cost of production or acquisition and the selling price. They form a differential, however, in a second sense. Profits are the surplus of the intramarginal over the marginal producer. At any given time, under competitive conditions, market price is the same, but cost varies. The cost of raw material, wages, rent, interest on capital borrowed or invested, taxes, and miscellaneous outlays like insurance, advertisements, and transportation expenses vary from individual to individual. Some will display more care in the selection of their labor force; some will choose a more advantageous location, with a saving in both rent and transportation; some will accomplish better results with less capital and economize in interest as well as taxes; some will exercise more ingenuity in purchasing the raw material or securing a market. At the bottom of the scale is the marginal producer, working under the least favorable circumstances, who can nevertheless get no more for his goods. With him price equals cost. The excess of price over cost constitutes profits.

In ordinary enterprises profit is the great lure of energy, and competition the great destroyer of profit. Competitive profits, the union of both, are hence the symptom of progress. They can exist only by being continually renewed; they are not attached to any community, but are a draft on nature. Profits are a result of price,

[1] Adapted from *Principles of Economics* (3d ed.), pp. 353–59, 366–67. (Copyright by Longmans, Green, & Co.)

not a cause of price. Production at a lower cost creates profits; competition forces prices down to lower cost and eliminates profits. Profits can be maintained only by the creation of a continually newer cost level lower than the new price.

Profits are sometimes described as the wages of superintendence. There are indeed certain occupations where the income partakes of the nature of wages. Commissions of a broker, like the fees of a professional man, are really wages, even though they are popularly called profits. Wages, however, differ from profits in that wages are a stipulated income and profits are a residual income. There is a normal rate of wages, there is no normal rate of profits. Wages are a part of cost, profits a surplus over cost. The entrepreneur may think that he deserves a return for his services, but whether he secures one depends on his competitors. There is always a certain level below which wages cannot fall, because no work would otherwise be done; but the very continuance of competitive profits depends on the abler producer cutting down cost to the point where the marginal producer earns no profits. The reduction of some wages to zero implies starvation of the laborer and the crippling of the productive force of the community; the reduction of some profits to zero means the elimination of the inefficient and the continuance of progress. Above all, profits differ from wages in that profits are the direct result of price fluctuations. The question thus arises as to the dependence of profits upon chance.

Aleatory or chance profits exist in varying degrees. Some are essentially unique or sporadic. If I find a pocket-book on the street or receive a bequest, the income is wholly aleatory. The line between aleatory and ordinary profits is, however, not so easy to draw. In the first place, we have a great field of speculative profits, to be discussed in a moment. Secondly, there is an element of luck in all business. The oscillations of demand and supply are frequently influenced by accident. A flood, an invention, a war, a new whim in fashion, a chance occurrence of any kind, may affect the individual or the group, the producer or the consumer, and by influencing either cost or price, modify business profits. In one sense all price fluctuations are accidental. The aleatory element is inseparable from profits, since profits are derived from fluctuations; but the ultimate cause of persistent profits is the ability of the individual to take advantage of the fluctuation—and in the long run this ability plays into the hands of society at large.

A third class of profits includes those which arise from speculation. By speculation is meant the purchase or sale of anything in the hope of profit from an anticipated change in its price. It differs from ordinary trade only in degree, for all profit, as we have seen, has an aleatory element. The difference, however, consists in the fact that speculation concentrates and intensifies the forces which affect demand and supply. So far as it has become the regular occupation of a class, differentiated from other business men for this particular purpose, it subserves a useful and in moderate times an indispensable function. The expert dealer on the exchanges, who studies and prejudges the market, will in the long run secure profits by reducing risks and steadying prices. In this wider sense speculative profits are earned like other profits. On the other hand, numbers of individuals without experience or ability are constantly taking "flyers" on the exchanges, and gamble in securities or commodities as they would in cards. Speculation here is as demoralizing to earnest effort and thrift as is the lottery.

In the preceding discussion profits, whether ordinary, aleatory, or speculative, have been assumed to be subject to competitive influences. The free play of competition, however, is often obstructed by natural or artificial barriers. When these obstacles are only partial, we speak of economic friction; when they are complete, we are in the presence of monopoly. In the case of friction, the fortunate possessor of the temporary advantages secures an extra gain, which, as we know, will ultimately disappear. In the case of monopoly the extra gain seems to be permanent. In the deeper sense, however, even monopoly profits are not permanent. This is due to the principle of capitalization. As soon as the monopoly producer disposes of his business, the profits are capitalized into the higher selling price, and the new purchaser will secure only the interest on the capital outlay. Thus, under modern economic conditions, even monopoly profits tend to dissipate themselves. They are essentially transitory, except in the hands of the original owners. With the continual shifting of ownership, so characteristic of modern life, the original possessors soon disappear. Since, however, the original owners at any given time are an appreciable body, monopoly profits often assume a great importance.

282. THE CONCEPTION OF PURE PROFITS[1]

By F. A. FETTER

The term profit (or profits) means broadly the residual share, the one non-contractual income in the business. It is what is left as a net gain to that person (or group of persons) who assumes the financial risks of the business, after paying off the claims of everyone else for any uses or services rendered. Profit in this broad and popular sense is a complex of incomes from various sources and must fluctuate in nature (as well as in amount) from case to case for reasons that are accidental and personal.

Is there, then, no exacter conception of profits possible? Among the various meanings in which the word is applied is there one not pre-empted by another term, one which expresses a sort of income found in practical affairs, which business men are constantly trying to estimate and of which economists must take account? Let us try to express such a conception in this definition: Pure profit is the income of the active capitalist *as such*, attributable solely to the active capital-investment in the particular enterprise. It is an investment-profit. The amount and rate of investment-profit are peculiar to each business and indeed to each investment. It is never an agreed price, or a contractual payment. It is the residual after the actual contractual dues have been paid, and the estimated value of other factors (such as the services of the manager, etc.) have been deducted. The investment-profit concept is most nearly exemplified in practical affairs in the bookkeeping of a corporation. Out of gross receipts must be paid all rents, interest, maintenance, and depreciation of the plant, price of materials, wages, salaries of managers and officers, fees of directors, etc.; the residue is the amount which may be paid as dividends to stockholders (or added to surplus) without impairing the capital-investment.

Even investment-profit usually is subjected to a comparison which divides it into two elements. It is of the very essence of the active capital function that it takes the financial risk of the outcome. When therefore at the end of the year (or income period) it appears that a certain profit has resulted (say $1,000), this is compared with the capital invested (say $10,000) and expressed as a percentage on the investment (thus 10 per cent). Now this in turn is compared with the rate of interest common on the safest loans (say 4 per cent) and

[1] Adapted from *Economic Principles*, pp. 343–49. (Copyright by the Century Co.)

the remainder is the amount (or rate) by which this active-capitalist investment exceeds the current rate of passive-capitalist investments. This merely *estimated* division influences further choice of investment. The rate of interest is taken to represent about what capital can do by itself (or with a negligible amount of judgment and supervision—an abstract conception) and the excess above that is attributed to the successful act of investment. Thus, however far we attempt to eliminate the personal service element of management from profits, there always remains in any active capital income this one element of investing management together with the carrying of financial risk. There is a dual character in investment profit; it is a capital-income and a labor-income, combined. The distinctive feature of investment-profit, which fastens our attention, is precisely this excess (or deficit) of income in active capital as compared with the normal prevailing rate of time-price, which can be secured by the most conservative passive investor. It is the hope of an income of *more than* ordinary interest that is the inducement to active capitalists to assume the risk. We may call the amount realized more or less than the imputed yield of passive investment, pure investment-profit, attributable to the exercise of *pure* investment function. The amount may be expressed as a rate on the investment. This is the utmost point that has been attained in the analysis of the complex elements of "profits" as popularly used.

To the person who exercised this function of active capital-investment various names have been applied: undertaker, its French equivalent *entrepreneur*, adventurer (especially used in former times of one who embarked in foreign trade), and enterpriser. Each of these was meant to express the assumption of the financial risk in undertaking the ownership of the various factors and of their results embodied in the products, in paying off other claimants, and in waiting for an income not determinable in advance, but contingent on all the various fluctuations of the market.

Enterprise is the act, or function, performed by the enterpriser, and in a different but related sense is the particular business establishment, or undertaking, which is carried on by an enterpriser. Business management and enterprise are functions not embodied completely in any individuals, but diffused more or less among groups of men. The active capitalist and the passive capitalist are not in contrast absolutely but relatively; the passive capitalist is not, and cannot be, completely freed from financial risk. Enterprise is merely

in this particular business the assumption of the legal financial responsibility to the extent of the enterpriser's credit and resources, or in other cases to the extent of the special legal limited liability, as (in most stock companies) to the amount invested, or (often in banking) to double the amount invested.

Risk is more or less everywhere in human affairs, but among various kinds of investments there is a well-recognized gradation in the uncertainty of returns. The enterpriser in a business takes the more exposed frontier of risk, and the various senior securities have prior claims. For example, if the business of a corporation goes badly, the first mortgage bonds, getting a low rate of interest, are the first claim on the income and, in case of insolvency, these bonds would be paid out of any assets of the company; so in turn till we come to the common stock which gets nothing until all the other claims are satisfied but which if the business is prosperous may get dividends at any rate permitted by profits. There is thus an investment risk, an element of enterprise even in the safest investment, e.g., government bonds, but this becomes almost negligible in the case of many well-proven investments.

It is easily seen why the income to enterprise is the most variable from one establishment, and from one time, to another. It contains within it all the non-contractual elements of income. The laborer has taken a fixed wage, the passive capitalist has reduced his risk and accepted a fixed interest. Both wage workers and passive capitalists have taken the easy way, have "played safe," and have left the enterpriser to bear the brunt of the financial risk. The income of each of these classes tends to conform to a general market-rate, being a medium of the gains and losses when labor and capital are applied with various degrees of risk in various undertakings. Enterprise is the most movable element. It is specialized risk-taking. Enterprise has well been called an economic buffer, which takes up and distributes the strain resulting from variations in the momentum and rate of movement of industry. The enterpriser feels first the influence of changing conditions. If the prices of his products fall, the first loss comes upon him, for the goods already made must be sold. Further loss is avoided as best it can be by paying less for materials and labor. At such times the wage-earners look upon the employer as their evil genius, and usually blame him for lowering their wages, not the public for refusing to buy the product at the former high prices. When, however, prices rise, enterprise gains through selling at higher prices

the stock on hand that has been produced at low cost. Enterprise is placed between the forces of competition, between owners of resources and ultimate consumers, between laborers and the final purchasers of labor's services. The enterpriser's economic survival is conditioned on vigilance, strength, and self-assertion.

Profits therefore fluctuate more from industry to industry and from man to man than do other incomes. The variations of the market may sweep away not only all "profits," but all the invested capital. As a consequence, profits may be at other times very high, for enterprise will not take the risk of great losses unless there is a chance of large gains. While the income of the salaried man is occasionally advanced, and then for long periods remains unchanged, the profits of enterprise come in waves. In seasons of prosperity profits in many enterprises swell with a dramatic swiftness while rents and wages move tardily upward. Then again for years profits fall to a level hardly exceeding a low interest on the capital invested or leave many businesses for a time with a loss.

B. Profits and the Assumption of Risk

283. THE FARMER'S RISKS[1]

By JAMES WILSON

The farmer supplies the capital for production and takes the risk of his losses; his crops are at the mercy of drought, and flood, and heat, and frost, to say nothing of noxious insects and blighting diseases. He supplies hard, exacting, unremitting labor. A degree and range of information and intelligence are demanded by agriculture which are hardly equaled in any other occupation. Then there is the risk of overproduction and disastrously low prices. From beginning to end the farmer must steer dextrously to escape perils to his profits and indeed to his capital on every hand.

284. THE WILL TO TAKE CHANCES[2]

By H. A. MILLIS

The strong desire of the Japanese to lease land is explained by several facts. In the first place, the members of this race do not like to work for wages, are ambitious, and desire to establish themselves

[1] *Yearbook of the Department of Agriculture*, 1910, p. 26.

[2] Adapted from *Reports of the Immigration Commission*, Vol. XXIII, 82–84, 86.

as business men or as independent producers, as most of them were in their native land. This ambition to rise from the ranks of the wage-earners has been one of the characteristics most strongly exhibited by the Japanese and must be emphasized in explaining their progress either in business or in independent farming. Moreover, by leasing land the farm laborer secures a settled residence, more regular employment, and, if he has a family, an opportunity to reunite it in this country.

Furthermore, the Japanese are venturesome. They are not deterred by risk to the same extent that members of other races are, and are greatly attracted by the unusual profits realized by a few of their countrymen. In some instances it has been found that not only are they highly speculative in their economic activities, but that they are inclined to reckon expenses and losses at too low a figure. All of these things have combined to cause the farm laborer to desire to become a farmer on his own account, and pride and a limited field of employment have frequently kept him from returning to the wage-earning class when the profits realized from farming have been small.

Another fact of importance in this connection is that many of the Japanese farmers have required little or no capital to begin with. As already indicated, many, in fact most of them to begin with, have leased land for a share of the crop, the landlord supplying all or practically all of the equipment. This is especially true in all localities where much seasonal labor is required and the Japanese are the predominant element in the labor supply. In these localities not only have the farmers provided most of the necessary equipment, but have also frequently provided the money necessary to pay current expenses, so that the tenant required no capital at all. Moreover, in the production of sugar beets the beet sugar companies have ordinarily advanced a part of the necessary capital.

One characteristic of Japanese farming is that with their short-time interests the farmers frequently specialize greatly in the production of the crop which has proved to be more than usually profitable. As a result of the rapid increase of these farmers in certain localities and this specialization, overproduction has resulted and profitable prices could not be maintained. This is especially true of the strawberry industry, which has been expanded rapidly by the Japanese because of handsome profits realized a few years ago, until the prices have become very unremunerative. A similar instance of overproduction is found in asparagus-growing on the Sacramento River,

where many of the Japanese tenants have been involved in great loss during the last two years. However, such instances are not common, and some of the Japanese farmers have realized large profits and have accumulated wealth rapidly.

285. SPECULATION IN WHEAT-GROWING[1]

The wheat crop of the average Eastern or Middle West community seldom involves more than a few thousand dollars; the average field seldom means more than a few hundred acres. Whether the wheat succeeds or fails will neither make nor break the Eastern or Middle West farmer. Even if late spring rains delay seeding, the ninety days required to grow and ripen a wheat crop will not bring the crop into frost danger of the early fall. Even if your farmer is delayed in putting in his crop till June, as many were this year, the chances are a hundred to one that he will harvest, house, and market his wheat before frost has limed the ground. But in the West, in the event of such delay, chances are a hundred to one against the farmer. The wheat crop is a gamble pure and simple. Big crops mean big fortunes. A failure on a crop means ruin. You can talk your head off to the farmer about the folly of depending on a one-crop system, of putting all his eggs in one basket, and so forth. As long as one year's crop may mean a fortune, Western farmers will chance all on that one crop; and one year's big success on a Western wheat farm does mean a fortune. It means the mortgage paid, or the cost of the machinery paid, or a brick house, or modern conveniences in the house, or a motor car, or a winter trip "back East" or to California. If it is a great success, it may mean all these things in one year.

To begin with, the Western wheat fields are not sixty-acre checkerboard squares. They run from 160 acres—the average homestead—to 1,000 or 2,000 or 3,000 acres, as the old wheat fields of Texas and California ran and as many wheat fields of Montana and Saskatchewan today run. Such fields require an early start in spring and expensive equipment in machinery. Much of the equipment is financed on credit. It means tractor engines that plow forty acres a day and disc and harrow in the same operation. It means tractors to draw the harvester; and in the Walla Walla area are harvesters that reap, thresh, and sack forty acres a day. The indebtedness of such a farm for overhead expenses may run all the way from $2,000 to $20,000 for the season—this purely for machinery, independently of the man-power expense; and the man-power expense of a wheat farm during

[1] Adapted from *Current Opinion*, LXI (August, 1916), 133.

the summer runs from $2.00 a day and board up to $8.00 a day and board, this last for the machinist operating the engines. I should not be afraid to wager that there is not a wheat farm of 200 acres in the West which has not been at some time $2,000 in debt for machine expenses for the season. I think of certain farms where the season's financing amounted to $30,000 of debt before a strand of wheat had been cut.

Cost of seed, of labor, and of machinery from the planting of the seed to the harvesting of the crop is now put at $7.00 to $8.00 per acre. Supposing a man has seeded a 1,000-acre field. He stands $7,000 out of pocket. Now, because the Western wheat lands are nearly all uplands they are subject to chill nights. In August come the early autumn night frosts. If the frost does not touch your 1,000-acre field, you stand, with wheat at $1.00 a bushel, to get $30 to $40 per acre. That means a tidy sum from 1,000 acres of wheat after only $7,000 of expenses have been paid. In August, therefore, your big wheat farmer suffers what can only be described as a sweat of agony. He may be living in a tar-papered shanty. His wife may be wearing a hat more honored for its age than its style. Whether he can pay his debts, whether the mortgage will be foreclosed, whether he can build a house and educate the "kids" and buy a motor and take the vacation that he badly needs—all depends on the fickle jade called Fate from August to September. No Wall Street broker hanging by the margin of an eyebrow to ruin or fortune ever knew more of a gambler's agonies than the Western wheat farmer in a year when a wet spring has delayed seeding.

NOTE.—Wheat is by no means the only agricultural venture about which this story of farmers' speculation might be told. The cattle-feeder takes long chances in the hope of making large gains. The southern truck-grower may stake his all on a big acreage of tomatoes or onions, the Westerner plunges in fruit, sugar-beets, or cantaloupes. —EDITOR.

C. Evidence of Profits in Farming

286. "PROFITS" ON NEW YORK FARMS[1]

BY G. F. WARREN

The average capital on 615 farms operated by their owners in Tompkins County, New York, was $5,527. The average receipts for the year April 1, 1907, to April 1, 1908, were $1,146. The average farm expenses were $389.

[1] Adapted from *Bulletin 295, Cornell Experiment Station*, pp. 395–98.

The receipts exceeded the farm expenses by $757. This represents the amount that was earned by the unpaid farm labor and the interest on capital. If we subtract 5 per cent interest on the capital, or $276, and $58, the average value of unpaid farm labor done by members of the farmer's family, we have $423 which is the average labor income of these 615 farmers. For their year's labor they received this amount of money in addition to having a house to live in and such products as the farm furnished. The labor income of tenants averaged $379.

A farmer's labor income might be nothing or even a minus quantity and yet he might live. If a farmer has $6,000 capital, and if the receipts were only $200 more than the farm expenses, his labor income would be $200 less the amount that $6,000 would earn if placed at interest. This would give a labor income of minus $100. Yet, if not in debt, the family would have $200 to live on. In this case they would be living on their interest, not on the product of their labor. In other cases men who are making money according to the opinions of their neighbors, really make nothing except interest. They get nothing for their work.

The farmers that are cited as the best ones are often not making more than interest on their capital. Others that are not thought of as successful are doing well. If a farmer has $10,000 and is not in debt or if he has a son working at home, he may be getting ahead and have an attractive place and yet not be getting more than interest on his capital and pay for the son's work, leaving nothing for his own work. Such farms are often written up in bulletins and papers as examples of model farming.

In order to see how accurately profitable farms may be told by appearance, each person taking records indicated his opinion of the farm while taking the record. Of the twenty-five most profitable farms in four townships, only four were correctly classed. One was put in the lowest class. The majority of those that were placed in the highest class failed to make good labor incomes. The appearances of a farm are not a reliable indication of profits. Attractive farms are frequently kept up by the interest on a large investment.

A farm cannot be said to be financially successful unless it pays all expenses, interest on the capital, the value of unpaid family labor, and a good wage for the operator.

Variation in labor incomes.—The average owner received $423 as pay for his personal labor and management for a year, but there were wide variations from this amount.

The common wages for a hired man in this region at the present time are $300 to $350, with house rent, garden, wood, and milk. Some of the better men receive more. Roughly speaking, we may say that one-third of the owners made less than hired men, one-third made about the same as hired men, and one-third made more than hired men (Table II). About one-third of the tenants made less than hired men, one-third did about as well as hired men, and one-third made more than hired men. It will be seen that 57 owners and 6 tenants made a labor income of over $1,000, and that 25 owners and 3 tenants made over $1,500. The highest labor income was $3,668 made by a man who operated his own farm.

TABLE II

VARIATION IN LABOR INCOMES ON 749 FARMS

LABOR INCOME	OPERATED BY OWNERS		OPERATED BY TENANTS	
	Number of Farmers	Per Cent of the Total Number	Number of Farmers	Per Cent of the Total Number
—$200 or less	18	3	1	1
—199— 0	62	10	3	2
1— 200	132	22	42	31
201— 400	146	24	44	33
401— 600	110	18	23	17
601— 800	58	9	9	7
801–1,000	32	5	6	5
1,001–1,500	32	5	3	2
1,501–2,000	19	3	0	0
2,001–3,000	3	½	3	2
Over 3,000	3	½	0	0

It is evident that farmers did not receive more than their share of the prosperity of the country. The years when these figures were taken were periods of good prices and good crops. There is no question but that farmers in the past received less than their share of the prosperity of the country—a fact that found its emphatic expression in the great movement from country to city. However, the one-third of the farmers who are making more than hired men are a hopeful sign for the future. It is now possible to make a good living on the farm.

To learn how these men were able to do so much better than their neighbors is the chief aim of this study. As we proceed, we shall see that a number of conditions seem to be necessary for success.

Percentage of profit made by owners.—Each farmer was asked to estimate what it would have cost to have hired the farm work that

he did. These estimates for the farms operated by owners in four towns averaged $326. The difference between receipts and expenses on these farms was $757. If we subtract from this the value of all labor done by the farmer and his family, the balance may be said to be interest that the farmer received on his investment. This amount is $373, which is 6.7 per cent on the average capital.

Profits made by landlords.—The landlords' receipts above expenses amounted to 8.3 per cent interest on their capital. This appears to be a good rate of interest. The money could be loaned on farm mortgages at 5 to 5½ per cent. But landlords have the trouble of looking after their farms. This usually causes more or less worry as well as labor. There is also more risk than with mortgages. Crops are not so sure as interest. The 2½ to 3 per cent seems to be the average pay that the landlord gets for the additional trouble and risk. An analysis of the figures indicates that, while the majority of the landlords made a fair profit, there were none of the fabulous profits that sometimes occur in other enterprises. Thirteen per cent of the landlords received 4 per cent or less on their money; 23 per cent of them received more than 4 but not to exceed 6 per cent; 19 per cent got between 6 and 8 per cent; 18 per cent between 8 and 10; 17 per cent between 10 and 15; and 10 per cent of them received 15 per cent or more on their investment. Of this latter group, 4 per cent received a return of over 20 per cent upon their investment.

The average labor income for the best of the four townships was nearly twice that for the poorest township in the case of owners and more than twice as great in the case of tenants. The difference was less marked in the case of landlords' return, but even here the best region excelled the poorest by nearly 50 per cent. The character of the land is of more importance to the man who operates it than to the landlord.

287. CONDITIONS IN THE CORN BELT[1]

By E. H. THOMPSON

An investigation of 273 farms operated by owners in three representative areas in the corn belt shows that the receipts per farm in all three regions approximate one-tenth of the capital invested. After allowing the expenses of operation, there remains a farm income of $1,938. This farm income, which represents the income earned by

[1] Adapted from *Bulletin 41, United States Department of Agriculture*, pp. 9–11.

the combined forces of labor and capital, is the amount available to the farmer for his living and savings, provided he had no interest to pay on any mortgage or other debt.

Deducting 5 per cent interest on the average capital leaves an average labor income of $408 for the 273 farm owners. This income, in addition to the food products furnished by the farm, represents the farmer's salary as manager of the business. It is evident that these men are receiving only a moderate sum for their year's work. If they sold their farms at inventory value and invested the money in good securities at 5 per cent, the interest alone on a capital of $30,600 would return them $1,530. In addition to this, they would have the amount they were able to earn at other work.

The assertion that farmers are making large profits is erroneous. They are living on the earnings of their investment and not on the real profits of the farm. A farmer having an investment of $20,000, with no mortgage, may receive a minus labor income, yet have nearly $1,000 as interest on which to live. It is assumed in this discussion that capital should return 5 per cent before allowing the farmer anything for his labor.

Variation in the labor incomes of owners.—In Table III the farms are divided according to the labor income received. Each group gives the number of men who made labor incomes ranging from minus $500 and more to over $5,000.

TABLE III

VARIATION IN LABOR INCOMES ON 273 FARMS OPERATED BY OWNERS IN INDIANA ILLINOIS, AND IOWA

Labor Income Received	Number of Farms	Percentage of Total Number	Labor Income Received	Number of Farms	Percentage of Total Number
−$500 and more.	26	9.9	$ 801 to $1,000..	13	4.7
− 499 to −$200.	23	8.4	1,001 to 1,500..	19	6.9
− 199 to 0.	40	14.7	1,501 to 2,000..	10	3.6
1 to 200.	53	19.4	2,001 to 3,000..	5	1.8
201 to 400.	34	12.4	3,001 to 5,000..	3	1.1
401 to 600.	23	8.4	5,000 and over..	4	1.4
601 to 800.	20	7.3			

One farmer out of every 22 received a labor income of over $2,000 a year. One farmer out of every three paid for the privilege of working his farm, that is, after deducting 5 per cent interest on his investment he failed to make a plus labor income. Analysis of their

farm business should show the reasons why so many of these men failed to receive anything for their labor. Is it because of poor crops, inferior stock, improper organization of the farm, or merely plain indifference on the part of the farmer? It may justly be said that all these factors are contributing causes.

Leaving out of consideration the limitations set by the size of the farm and the capital invested, the characteristics of the inefficient farmer stand out prominently. Economically speaking, the greatest losses figured on the basis of a labor income are due to indifference or contentment on the part of the farmer. His farm area and capital are sufficient to earn a substantial income. He fails through neglect of work, low crop yields, inefficient stock, poor farm organization, and unused capital. His expenses are the same per acre as those of good farmers. His receipts are the weak point. His neighbors succeed, not by spending less, but by taking in more.

The size of the farm must also be considered in figuring losses, but large losses are not probable in a small business. The little farmer may lose all he has, but the greatest amount he can lose is small.

The relation of profits to the efficiency of the farmer is shown in Table XI.

TABLE XI

RELATION OF PROFITS TO THE EFFICIENCY OF THE FARMER ON 273 FARMS OPERATED BY OWNERS IN INDIANA, ILLINOIS, AND IOWA

LABOR INCOME	NUMBER OF FARMS	AVERAGE SIZE (ACRES)	AVERAGE CROP AREA (ACRES)	DISTRIBUTION PER ACRE				
				Receipts	Expenses	Farm Income	Interest	Labor Income
—$500 and more..	26	267	199	$10.98	$5.97	$5.01	$8.74	—$3.73
— 499 to —$ 200.	23	160	117	12.02	5.92	6.10	8.16	— 2.06
-- 199 to 0.	40	102	77	12.94	5.53	7.41	8.30	— .89
1 to 200.	53	120	95	14.84	5.70	9.14	8.31	.83
201 to 400.	34	139	96	14.98	5.37	9.61	7.42	2.19
401 to 600.	23	161	118	17.80	5.79	12.01	8.78	3.23
601 to 800.	20	184	140	17.13	5.16	11.97	8.22	3.75
801 to 1,000.	13	217	160	16.77	4.51	12.26	8.14	4.12
1,001 to 1,500.	19	201	169	19.18	5.00	14.18	8.23	5.95
1,501 to 2,000.	10	249	179	25.79	9.60	16.19	9.31	6.88
Over $2,000	12	330	240	25.46	7.14	18.32	8.46	9.86
Total or average	273	178	133	17.28	6.39	10.89	8.60	2.29

In Table XI the farms are classified according to labor income. The men making the poorest and those making the best profits have large farms. Those just "breaking even" have, on an average, small farms.

Many of these men are also poor farmers, but they cannot be expected to do as well as those working a large area. We do not find the gross inefficiency among the tenants, for they must earn rent which goes to the landlord, and if they receive nothing for their labor they cannot live. They have no interest on which to live as does the farm owner with a large investment. The country would be benefited if the few inefficient farm owners on the large farms were persuaded to rent their farms to enterprising tenants. They would still have as much or more than they are getting, and the tenant would have a good living.

288. THE CHESTER COUNTY SURVEY[1]

By W. J. SPILLMAN

The markedly greater efficiency of the large as compared with the small farm has been clearly demonstrated when considered from the standpoint of the labor income of the farmer; but when we consider the subject purely from the standpoint of the interest on capital invested the story is a different one, as is seen in Table XXXII. In most parts of Europe this matter is considered from the latter standpoint only.

TABLE XXXII

INCOME ON CAPITAL ON 378 OWNER FARMS, CHESTER COUNTY

Area groups, acres....	13 to 40	41 to 60	61 to 80	81 to 100	101 to 120	121 to 160	Over 160	Total	Total Tenant	Total Special
Number of farms.....	54	61	60	68	52	61	22	378	124	27
Percentage farm income is of capital invested.....	10.4	13.5	13.2	12.7	12.5	12.6	11.8	12.5	13.5	17.9
Percentage of income on investment when value of farmer's labor is deducted..	4.3	8.6	9.8	9.7	9.8	10.2	9.8	9.4	10.4	14.7

The agriculture of Europe is based mainly on income per acre. In America more attention is given to income per farm family. The reader is left to himself to judge whether it is better for the country as a whole that our agriculture should be efficient from the standpoint of the people on the farm or from the standpoint of the capitalist who owns the land. Fortunately, as yet, in this country the capitalist and the farmer are frequently the same, but even where this is the case it is the income per farm family rather than the percentage

[1] Adapted from *Bulletin 341, United States Department of Agriculture*, pp. 66–71.

of profit on the capital invested which makes for good citizenship in the country and for a high standard of living on the farm.

In making the calculations the results of which are shown in Table XXXII the farm income is first reduced to percentage of capital invested. In the first line of the table the value of the farmer's labor is left out of consideration, the entire net income being treated as the percentage of profit on capital invested. There is seen to be relatively little variation in the figures for different sizes of farms except that in the smallest and the largest groups the figures are somewhat smaller than in the intermediate sizes, and in these intermediate sizes the two smallest show a somewhat larger percentage profit than the three groups of larger farms. The last line of the table was calculated by using the farmer's own estimate of the value of his labor, subtracting this amount from the net farm income, and then expressing the remainder as percentage profit on capital invested. This method corresponds to that usually used in industries where everyone connected with the business receives a salary. The average percentage profit calculated in this manner is 9.4 per cent for the 378 farms operated by their owners. Except for the farms of 40 acres and less, there is comparatively little variation in the profits. It is because profits have so often been figured in this manner that the public has been misled as to the advantages of the large as compared with the small farm. It is interesting to note, as shown in next to the last column of Table XXXII, that the percentage profit on the tenant farms calculated by both methods is larger than it is on the owner farms. We shall later see the reason for this.

The year in which this survey was made happened to be one which was rather favorable to the mushroom business, and the average profits made by farmers who grow mushrooms were considerably larger than those of the more usual types of farming in this region, as is seen by the last column of Table XXXII. There are, however, years in which the reverse is very distinctly the case.

The average net income of the landlords who own the 124 tenant farms here under consideration was, for the year 1911, 7.3 per cent of their invested capital. In comparing the labor income of owners and tenants in the same locality, the fairest comparison is made when the interest on capital is estimated in both cases on the basis of the interest received by landlords. Such a comparison is made in Table XXXVII between the 378 farms operated by their owners and the 124 tenant farms found in this survey. When capital is allowed an

income of 7.3 per cent, the average labor income of the 378 owners is $548. Under similar conditions the average labor income of the 124 tenant farmers is $739.

TABLE XXXVII

A Comparison of the Labor Income of Owners and Tenants by Allowing 7.3 Per Cent Interest on the Total Farm Investment, Instead of 5 Per Cent (7.3 Per Cent Is the Average Rate of the Landlord's Interest on Investment); Survey 1912, Chester County

	Number of Farms	Number of Acres	Per Farm		
			Capital	Farm Income	Labor Income
Owners	378	90	$10,486	$1,313	$548
Tenants	124	106	12,030	1,617	739

Approximately half of this difference is due to the fact that the tenant farms on the average are more than one and one-fourth times as large as the average of the owned farms, but part is also probably due to the fact that the tenant farms on the average have a larger number of dairy cows, usually of somewhat more than average quality. While these tenants make larger labor incomes than the owners, it must be remembered that the owners have the interest on their investment in addition to this labor income, so that the owner's families have larger total incomes than those of the tenants.

This bulletin contains ample evidence that the young farmer who has relatively little capital will find it to his best interests to become a tenant on a farm of considerable magnitude rather than to undertake the same type of farming on a much smaller farm which his capital might enable him to own.

D. Some Opinions on Profits in Farming

289. "WHAT IS THE MATTER WITH FARMING?"[1]

By WALDON ALLAN CURTIS

There are, of course, all sorts of causes of the contemporary desertion of farms in the old states, but the principal cause is that farming is badly underpaid, that in no other line of endeavor do the same physical strength, mental ability, and capital command so little. Desertion has been faster in the East, for the countless factories give

[1] Adapted from *The Independent*, LXVII (December 30, 1909), 1485–88.

the farmer an opportunity to change his employment that is lacking in the West. Today the Western farmer, like the Eastern, begins to see he is underpaid for his work, and more than that, he sees that with the present price of Western farm lands, the interest on his investment is glaringly inadequate. For after all, in buying a farm, you only buy a job, and if you can get a job without buying it and put your money in a bank, how much better you are off. Realization of this fact is a great though not recognized factor in the depression of Eastern farm values. Realization of this fact will send down the high prices of Western lands before those lands have been depleted. The farmer sells his labor in the form of cabbages, potatoes, eggs, wheat. He makes a small per cent on the cost of his farm, machinery, and work animals. Very likely, he barely keeps even on the last two items and has them merely that he may sell his labor. In Wisconsin a farmer makes his wages and 3 per cent on his investment—a low rate for that section. If you are a Wisconsin farmer possessed of an average-sized Wisconsin farm, two hundred acres worth the average Wisconsin price of one hundred dollars an acre, would it not profit you to sell the farm, invest your money at 4 per cent anyway, and probably 5, and sell your labor in some occupation in a town? Or why should a man in Massachusetts with $5,000 spend it in buying a job by buying a farm, when he could buy a house in town for $2,500, put $2,500 in the savings bank and sell his labor for money to a mill owner instead of to a storekeeper for barter?

The census for 1900 gives the national average of the wages of white farm laborers working a ten-hour day without board, as eighty-seven cents. This was all the farm employee could earn, all the farm employer could afford to pay. Any sort of discussion of the remunerativeness of farming in the last decade is almost needless in view of these figures. Montana paid the highest wages, $1.72, the Carolinas the lowest, fifty-three cents. Wages in the South were low, but Michigan paid only ninety-eight cents, Wisconsin ninety-nine, Indiana eighty-one, Illinois ninety-one. To be sure, the farmer gets his living off his place, but the farm laborer working at an average of eighty-seven cents has nothing included with that. Perhaps you will ask about the stories of farm profits to be read in agricultural magazines and about the constant statement of farmers' prosperity in the editorial columns of a myriad daily papers. The stories of personal experience in the agricultural press are psychologically much the same as patent medicine testimonials. The poor fellows like to see themselves in

print. A farmer who one year in a discouraging life made three hundred dollars from a few pigs tells about it. One profitable apple year makes the basis of a wondrous tale to which the paper refers editorially when it tells for the thousandth time how much better off the farmer is than anyone else. The agricultural paper gives and the farmers themselves get the impression that the exception is the rule and keep on living in their fool's paradise. That is a diminishing number, diminishing relatively, at least, have done so, but cajolery has lost much of its power.

The farmer bumps along because he works more hours than the town laborer and because his whole family work. The mill-hand goes to work when the morning whistle blows. He has no preliminary labor of preparation. His pay begins when his work begins. Before the farmer can begin his ten-hour day of actual productive work, he has to spend from one to three hours with his animals, tools, vehicles, in order that he may use them in the work, and at night he works one or two hours after the mill-hand is through for the day. The farmer manages because the labor not only of himself, but of his children and wife, is given to reach the wage return of a single worker in an industrial employment. If the children of the mechanic work, they get paid for it. They do not have to throw in their labor with that of their father that he may receive a day's wages. People laugh because rich men playing farmer spend more than their crops return. Even the farmers, who should know better, laugh. Selling below cost of production is the whole history of agriculture. Unpaid slaves, underpaid peasants, and farmers. When the decline in the size of families is advanced as one explanation of the unsatisfactory state of agriculture, the nail is hit on the head. The Eastern farmer of today simply cannot throw in enough gratis labor with his own to make a living.

There are, of course, exceptional farmers who make money, men who raise special things for special markets, and men who, by the ability to handle labor, make money from directing the work of others, manufacturing wheat and corn. But every cobbler is not a shoe manufacturer, and few farmers are more than agricultural laborers after all. Be not deceived by big barns full of horses, big sheds full of machinery. Look into the house. There may be twelve horses in the barn. The house is more poorly furnished than that of a factory hand. The family has fewer clothes than that of the factory hand. The farmer—in the West—spends considerable sums in the

village, buys harnesses, wagons, mowers, reapers, poisons. He seems to others and even to himself a man of means, spending these large amounts. But for all his expenditures his returns are only those of a moderately paid factory-hand. He has to have all those horses and that rolling stock as a prerequisite for earning his day's wages.

Despite the increased price of provisions in the past few years, I doubt if the farmer has begun to feel the advance. Cost of production has increased. Think of the single item of the cost of fighting quack grass, which has spread through thousands of square miles that knew it not a generation ago. Farming is 20 per cent slower where the pest exists. We have dozens of insects preying upon both plants and animals, which our grandfathers never saw, and this means poisons and washes and machines to apply them, to say nothing of the time spent in applying them. Soil depletion means more fertilizer and the price of fertilizer does not merely increase. It jumps.

290. FARM INCOME BETTER THAN CITY INCOME[1]

Colonel J. B. Power was for thirty years a surveyor and railroad builder before he settled down on his farm in North Dakota. Now, at eighty, he has had thirty years of practical experience in farming, but has always kept in close touch with city affairs. He is particularly well equipped to compare the farmer's income with the income of the city man.

"One of my sons is president of a bank in St. Paul," said Colonel Power. "Another is president of a large manufacturing company in Minneapolis and a third is here on the farm with me. All are married and have families, and all make good incomes. Of the three incomes, however, that from the farm is not only the most easily earned but it leaves a larger cash surplus than either of my other sons has at the end of the year. Our farm here contains 2,500 acres and represents a total investment of about $100,000. We actually till 1,112 acres, of which this year 480 acres was in crops and the balance was pasture land. Of these crops our wheat brought $3,734, oats $1,080, barley $300, fodder $686, hay $625, potatoes $150. Besides these crops there was a garden from which we got vegetables and fruit for our two families—my son's and my own—as well as for the hired help.

"The total cash value of the crops grown on the farm in this year was $6,575 and the total cost in cash of operating the farm was

[1]Adapted from *The World's Work*, XXIV (September, 1912), 587–89.

$2,745. If we had sold all the crops this would have left net receipts in excess of expenditures of $3,830 or 9¼ per cent on the value of the land. But this is not all of a farmer's profit. We got from the farm, without additional labor, pasturage for 75 sheep, 10 milk cows, 20 work horses, and the entire herd of 300 beef cattle. By feeding the corn, oats, and barley to the live stock we got more for these grains than the market prices mentioned above. Taking our average live stock sales, it adds another $3,000 net profit to the cash income from the farm or, in all, something more than 6 per cent on the investment value of $100,000, not all of which investment, however, is utilized in producing this income, as more than half of the land is not used at all.

"Now consider what we get out of this investment. We have first a living, which includes everything except clothing and groceries, and part of them are paid for by the products of the farm which are not otherwise converted into cash, such as eggs and butter. This is a living for two families. To support two families in either Minneapolis or St. Paul, and support them as well as we can support ours on the farm, would cost, with present prices, from $2,500 to $4,000 a year for each family. I am in a position to estimate this accurately because I know very closely what it costs my sons who live in those cities to get along. If a living for two families is worth only $5,000 a year in the city, then the income from this farm is equivalent to an income of $12,000 a year in the city.

"In addition there are many other conditions which favor the farmer rather than the city man. My son's manufacturing business pays him a good salary and an income on his stock, but he is facing, first, a constant and rapid depreciation in the value of his buildings and machinery, a fluctuating market which may at any time reduce his profits to a very small amount if not wipe him out entirely, and a tremendous fire risk compared with any such risk we have on the farm. If all our buildings were destroyed by fire, they could be replaced for probably 15 per cent of the entire capital value. Depreciation on farm machinery of course figures out at a rapid rate, but the total machinery investment is small compared to that in a factory. The depreciation on buildings is at a much lower rate than in the city. And I am not taking into consideration at all here the fact that if we did not raise anything on the farm except barely enough to live on, we should still be making $2,500 a year through the increase in the land value, which will average at least $1 an acre a year, and this

very much more than offsets any depreciation in buildings and machinery.

"As you get down into smaller farms the comparison between the farmer and the city man of equal income is much more favorable to the farmer. The city workman who earns $3 a day and pays $12 a month rent is infinitely worse off than the small farmer who earns from his farm only barely enough to maintain his family. The city workman is never sure of his job any more than the city manufacturer is sure that his business is going to continue to prosper. The farmer, whether on a small scale, or a large scale, knows to a certainty that there are going to be more people every year wanting the things which he produces, and that with ordinary intelligence and a reasonable amount of work he can never fail or be out of a job."

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